AMERICAN GAS ASSOCIATION MONTHLY

Vol. VIII No. 12

DECEMBER, 1926

"The Future of the Gas Industry"

By GEO. B. CORTELYOU

President, Consolidated Gas Company of New York

UNDER this title, Mr. Cortelyou discusses the present position and future outlook for our business. Here is an article that every executive, every employee and every director should read. Furthermore, copies should be sent to bankers, prominent business men, heads of local civic organizations and others.

By special arrangement, the Association is able to offer a twelve-page reprint of this article at one cent a copy. Already orders for more than 115 thousand copies have been received, and every company is requested to place its order immediately if prompt delivery is wanted.

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AMERICAN GAS ASSOCIATION MONTHLY

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HOWARD F. WEEKS, *Editor*

VOLUME VIII DECEMBER, 1926 NUMBER 12

CONTENTS

Greetings
1926

American
Gas
Association

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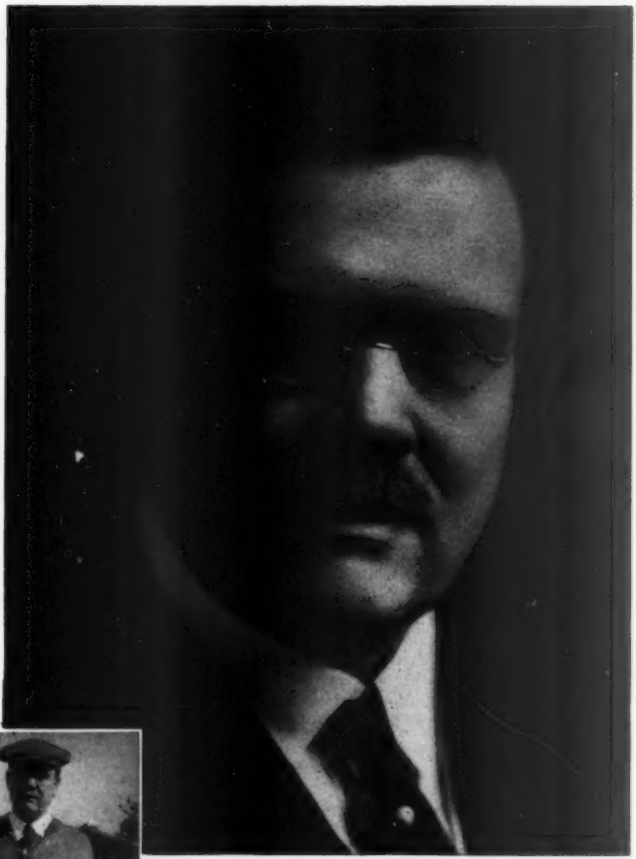
Our Own Who's Who



XIX

Bernard J. Mullaney

Born in Woodhull Township, Steuben County, New York. Educated in country school, supplemented by terms in town schools of Addison and Corning, New York; taught country school one year and with the net proceeds went to Minneapolis. Was reporter, city editor, traveling correspondent, political editor, etc., on Minneapolis and Chicago papers. Left newspaper work for advertising with a retail merchant, a department store, and later Armour & Company. Four years in public office (1907-1911) as Secretary to the Mayor of Chicago, and as Commissioner of Public Works of City of Chicago. During world war was in "no-pay" organization drafted by Chairman Samuel Insull to operate State Council of Defense of Illinois. Was in charge of publicity. After war (1919) invited by Samuel Insuli into The Peoples Gas Light and Coke Company. Started as director of public relations; organized industrial relations department in 1921, comprising administration of employees' representation and all personnel work, and became Manager of Industrial Relations. In 1924 was made Vice President in charge of public and industrial relations, including service to customers. Has advisory and supervisory functions in relation to publicity, advertising, etc., of Commonwealth Edison Company and utilities under direction of Samuel Insull.

AMERICAN
GAS ASSOCIATION
MONTHLY

Vol. VIII DECEMBER, 1926 No. 12

Training for Public Utility Management at Harvard University

A Course That Gives Consideration to the Economics of Utilities By Instruction By Actual Cases

By PHILIP CABOT
Harvard Graduate School of Business Administration, Cambridge, Mass.

IN the old days, and in fact not so long ago, when the young man wished to enter the legal profession, he found the best practicing lawyer available, and asked for the privilege of reading law in his office. It was a sort of hour-glass method, to be sure, but in the course of time his knowledge became sufficient for him to hang out his shingle and undertake the practice of law. Fifty years ago, however, this method of training became obsolete, and the school of law was developed as the most expeditious means of entering that profession. Similarly the student of medicine forsook the village practitioner and his wearying rounds, and now without exception attends a medical school.

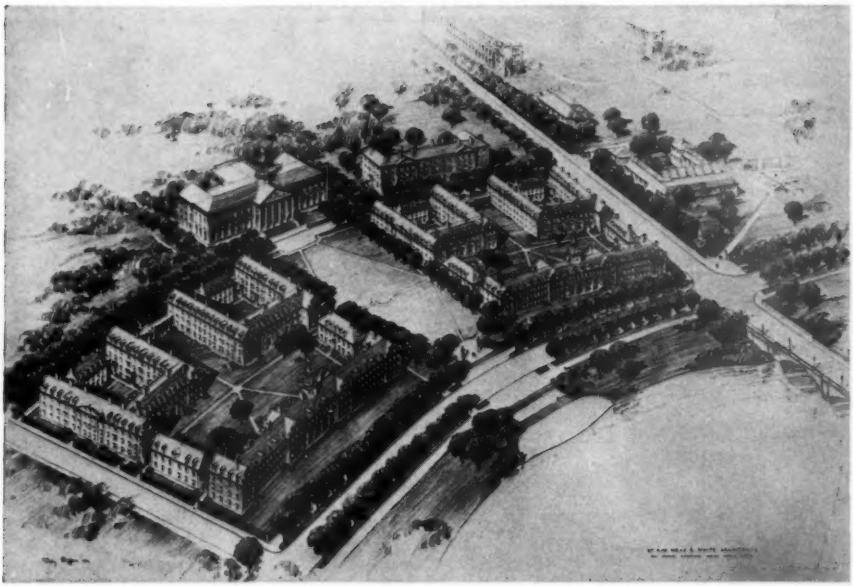
Business, however, has been singularly slow in carving out for itself a means of training for responsibilities within its doors; the widespread interest in business schools is of comparatively recent origin.

The demand for specific training in business comes both from the young men choosing business for a career, who feel that while college is perhaps teaching them how to live, further and more specific training is needed in the field of their life work, and from business itself, complex and diversified in modern industrial organization.

It is only natural, then, that the Harvard Business School, one of the oldest and with one exception the only exclusively graduate school of business in the country, should include, in the development of its curriculum, a course in Public Utility Management, attempting to train men to enter this oldest and probably most rapidly growing industry.

With this rapid growth has come the opportunity and the need for trained men, familiar with the complex problems of the industry, and capable of dealing with the varied legal, engineering, economic, and financial phases of management incident to the rapid expansion both of service and capital investment.

The course in Public Utility Management is based on the study and discussion of cases—not only the leading legal cases indicating the extent and method of public regulation of the industry, but also the actual problems of business management brought from the desks of utility executives all over the country, illustrating methods of marketing operation, production, finance, and customer relations. The classes often meet, therefore, as



Bird's eye view of the Harvard Business School's new group of buildings comprising the George F. Baker Foundation

boards of directors with the instructor as chairman, for the purpose of discussing questions of business policy and administration.

This method of instruction by actual cases awakens the interest of the students by forcing them to become active and thinking participants in discussions, by which they acquire a knowledge of the principles of public utility management, and of the methods of analysis and diagnosis common to all business problems.

The course is in no sense technical, nor does it aim to present only standard practice; rather it attempts to consider from the point of view of fundamental economic principle the underlying tendencies of the utilities. In fact practically every vital problem now facing the industries is an economic one, and the very designation of an industry or business as a public utility is an economic rather than a legal problem.

The complex problems of rate structure have their foundation in economic laws, and a scholar in this field must begin his efforts in the realm of the "laws of diminishing and increasing returns," and in the study of such fundamental subjects as "elasticity of demand," the theories of "value" and of pricing.

Hence the technique and routine of the industry is without the scope of the course, while intimate and searching economic analysis is made into the executive and administration problems of that changing group of industries, first set apart by the common law of olden times as "public utility" enterprises.

TESTS OF ALPHA LOBELIN

RECENT medical tests sponsored by the American Gas Association and carried out with the supervision of Dr. Cecil K. Drinker by Dr. W. B. Cannon, of the Harvard School of Public Health, and Dr. Soma Weiss, of the Boston City Hospital, indicate that there is no substantial value in the use of the compound known as Alpha Lobelin for resuscitating persons overcome by gas. These conclusions do not extend to cases of drowning or electric shock.

A detailed statement of these tests and experiments will be given in an early issue of THE MONTHLY.

Practical Use of the Degree-Day Method of Comparing Gas Heating Costs

By EUGENE D. MILENER
Baltimore, Md.

A PRACTICAL application of the degree-day method of calculating the heat requirements of buildings is found in its use for checking the gas consumption in gas heated houses in Baltimore. The writer first began using this method of comparing the gas used for heating various houses in January, 1916, and has found it to be the most useful method yet devised for this purpose.

In a large city in which a great number of gas-heating systems are in use, naturally the question of operating cost is raised from time to time by various users. This question is somewhat complicated, due to the fact that all gas used in dwellings is measured through one meter, whether the gas is used for house heating, cooking, water heating, laundry, or other purposes. Gas used for heating commercial and industrial structures is supplied through a separate meter. Most inquiries from customers concerning the amount of gas billed to them are referred to the general service department of the company which investigates and adjusts inquiries and complaints of every nature. It is only when special or unusual complaints or inquiries are received concerning the amount of gas used for heating that the house heating department is called upon for assistance. In some cases the adjuster is merely given assistance in the office before he calls on the gas heating customer, but in many cases a representative of the house heating department not only assists in preparing data on the case, but accompanies the adjuster when he calls on the customer.

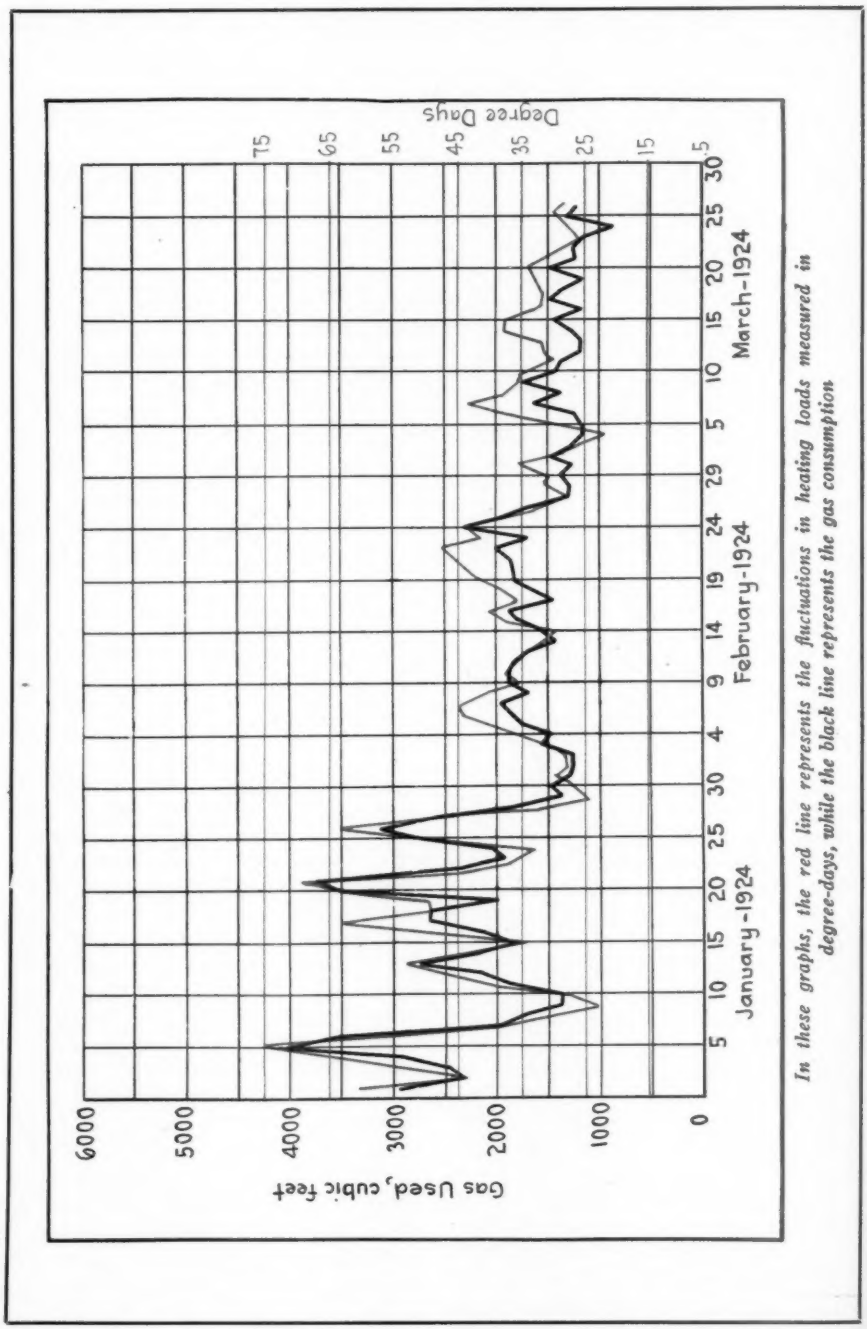
There is one condition that is different when purchasing gas for heating purposes, compared to purchasing liquid or solid fuels. All other fuels but gas are purchased and delivered in bulk or stored on the premises adjacent to the furnace until ready for use. On the contrary, no gas is ever stored on the premises to be heated, but it is delivered in any quantity required whenever heat is needed. Furthermore, this flow is accurately measured and recorded on an instrument that has proven itself through many years of service to be one of the most reliable measuring devices ever invented. The readings of the gas meter, therefore, serve as a basis for the application of a scientific comparison of heat needed and heat generated.

EDITOR'S NOTE

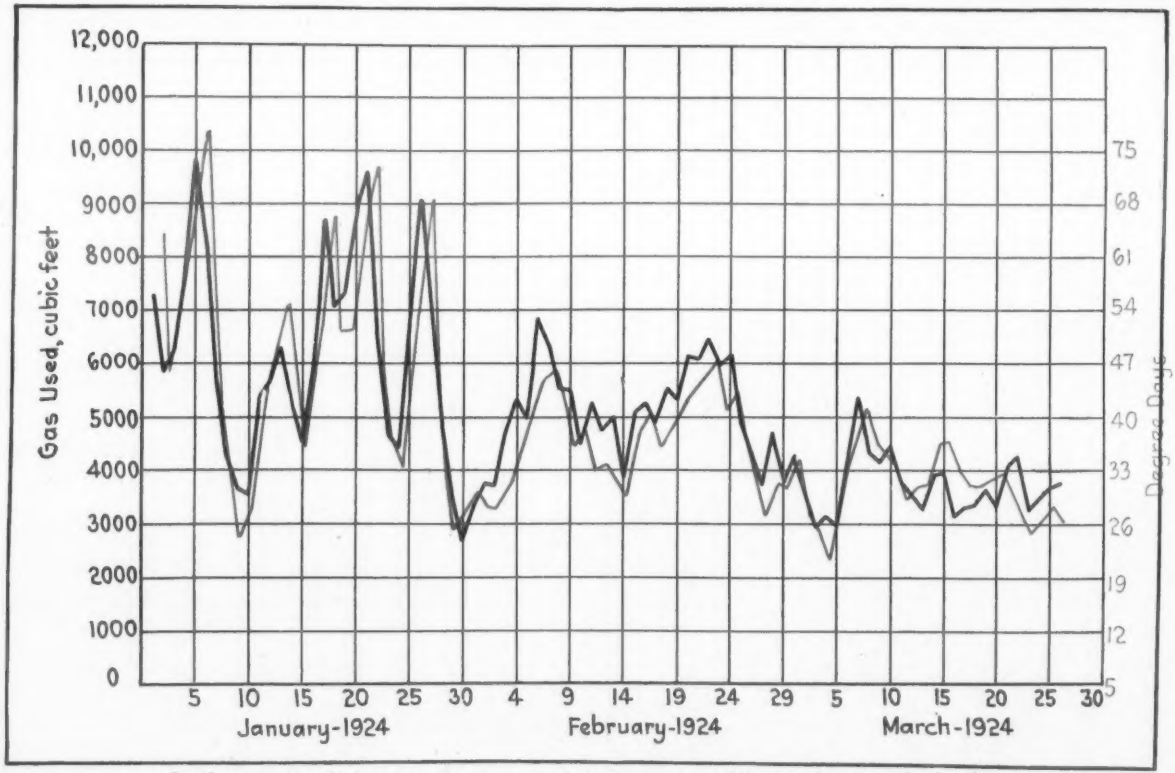
Here is an interesting example of how closely fuel consumption follows the degree-day load curve in residences where the temperature is thermostatically controlled, such as the above Baltimore house which has been heated by gas for 11 consecutive years. The diagrams on the next three pages give the daily temperature and meter readings in three different homes heated with gas. It is really extraordinary with what fidelity the gas consumption follows the short high peaks of the various cold snaps.

It is unfortunate that due credit cannot be given to the source of these interesting curves, as due to a clerical error in filing, by the original publisher, it is not known.

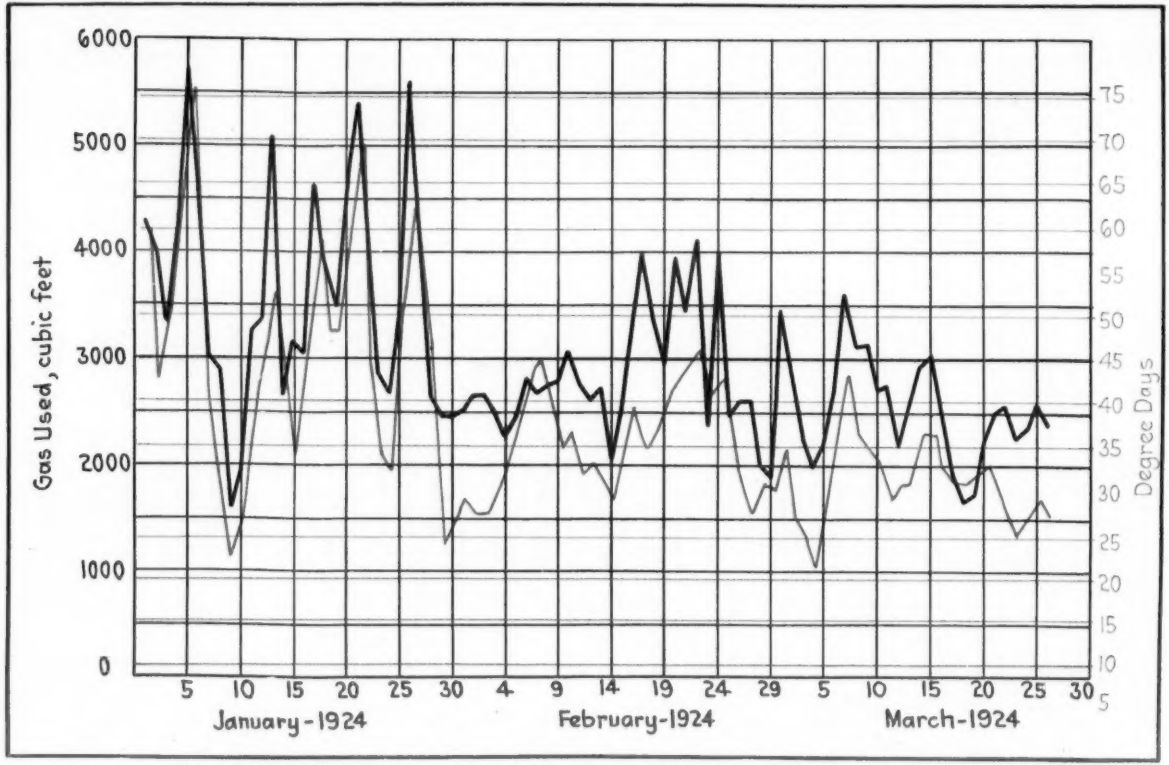
Article and charts printed by courtesy of The Heating and Ventilating Magazine.



In these graphs, the red line represents the fluctuations in heating loads measured in degree-days, while the black line represents the gas consumption



In these graphs, it is interesting to note that the greatest difference between the heating load, as represented by the red line, and the gas-consumption curve, represented by the black line, comes at the points of lowest load



This graph and the two foregoing graphs represent three houses on which careful recording records were made and it will be noted that the red line in each case is identical with the others as the records cover the same period of time

To place reliable data on heat requirements in the hand of the adjusters, the house heating department daily compiles the degree-days for the meter-reading period ending on that day. It is necessary to compile these data daily as it is customary in most large gas companies to read a certain block of meters each working day, which results in monthly billing periods ending on different days and having variations of from 28 to 32 days. As soon as these data are compiled each day they are sent to the general service department, and copies are given to every adjuster. Armed with this information the adjuster is in a position to talk heating costs intelligently, and does not have to rely upon his memory as to how cold it was at this time last year.

Let us follow the steps the adjuster takes to determine the accuracy of the heating costs and to convince the customer of this accuracy.

First, he secures a complete record of the customer's monthly gas consumption for the last two years. He also secures the last meter index as reported by the meter reader. He then makes a comparison of the number of degree-days in the period under discussion and the corresponding period of the previous year. If the number of days is different, adjustment is made to correspond. In most cases, this is as far as it is necessary to go, as an explanation to the customer that the heating cost is directly proportional to the "heating load" as measured by the degree-days, which automatically take the temperature into consideration, is sufficient.

If the gas consumed per degree-day per month varies considerably, investigation into local conditions is made and the results of this investigation are taken up with the owner. Frequently conditions are thus exposed of which the owner is entirely ignorant.

This system of keeping tab on gas heating costs has been a wonderful help in stabilizing automatic gas heating in Baltimore. People are willing to pay a reasonable figure for services rendered, and it is only necessary, in case of dispute, to present real facts in order to quickly reach an amicable settlement.

COMPARISON OF GAS HEAT REQUIREMENTS FOR METER READING PERIODS ENDING IN FEBRUARY 1925-1926

Meter Reading Section	*Meter Reading Date*		*Number of Days in Meter Reading Period*		*Average Temperature for Meter Reading Period, Deg. F.*		*Degree Days For Meter Reading Period*		*Heat Requirements Percent Increase 1926 over 1925*
	1926	1925	1926	1925	1926	1925	1926	1925	
A	Feb. 1	Jan. 31	30	29	34	32.7	930	937	0.7*
B	Feb. 2	Feb. 2	29	30	33.8	33.3	905	951	4.8*
C	Feb. 3	Feb. 3	29	29	33.4	33.2	887	922	3.7*
D	Feb. 4	Feb. 4	29	29	33	33.2	928	922	0.6
E	Feb. 5	Feb. 5	29	29	32.9	33.3	931	919	1.3
F	Feb. 6	Feb. 6	29	29	33.2	33.3	922	919	0.3
G	Feb. 8	Feb. 7	30	29	33.5	33.7	945	908	4.0
H	Feb. 9	Feb. 9	29	30	33.6	34.7	911	909	0.2
I	Feb. 10	Feb. 10	29	29	33.6	35.7	911	849.7	7.3
K	Feb. 11	Feb. 11	29	29	33.5	36.3	914	812.3	12.5
L	Feb. 12	Feb. 12	29	29	33.7	36.5	908	826.5	9.9
M	Feb. 13	Feb. 13	29	29	33.6	36.7	911	820.7	10.9
N	Feb. 15	Feb. 14	30	29	34.1	36.9	927	814.9	13.7
O	Feb. 16	Feb. 16	29	30	33.7	37.1	908	837	8.4
P	Feb. 17	Feb. 17	29	29	33.1	37.6	925	841	9.9
Q	Feb. 18	Feb. 18	29	29	32.9	37.6	931	794.6	17.2
R	Feb. 19	Feb. 19	29	29	32.7	37.7	937	791.7	18.3
S	Feb. 20	Feb. 20	29	29	32.9	37.7	931	791.7	17.5
T	Feb. 23	Feb. 21	31	29	33.6	38.5	973	768.5	26.6
U	Feb. 24	Feb. 24	30	31	34	40.4	930	762.6	21.9
V	Feb. 25	Feb. 25	30	30	34.6	40.5	912	735	24.0
W	Feb. 26	Feb. 26	30	30	34.9	40.8	903	726	24.2
X	Feb. 27	Feb. 27	30	30	35.2	41.3	894	711	25.7
Y	Mar. 1	Feb. 28	31	30	34.7	41.4	939	708	32.6
Z	Mar. 2	Mar. 2	31	31	35	41.1	930	741	25.5

*Denotes decrease.

Form of Data Sheet Furnished to Adjusters by House-Heating Department

EDITORIAL

By ALEXANDER FORWARD
Managing Director

A Text from President Coolidge

TO the broad advertising of business, President Coolidge, in his address before the American Association of Advertising Agencies, attributes a large share of the great progress and prosperity of the United States. Thoughtful students in every walk of life are watching the business success of America, contrasting it with the business success of other nations, striving to determine the essence of what is responsible. The only conclusion that can be drawn is that liberal advertising has been a great creative force in American business life.

The President is quoted as saying: "When we stop to consider the part which advertising plays in the modern life of production and trade we see that basically it is that of education. It informs its readers of the existence and nature of commodities by explaining the advantages to be derived from their use and creates for them a wider demand. It makes new thoughts, new desires and new actions.

"Somewhere I have seen ascribed to Abraham Lincoln the statement that 'In this and like communities public sentiment is everything. With public sentiment nothing can fail; without it nothing can succeed; consequently, he who molds public sentiment goes deeper than he who enacts statutes or pronounces decisions. He makes statutes and decisions possible or impossible to be executed.'

"Advertising creates and changes this foundation of all popular action, public sentiment or public opinion. It is the most potent influence in adopting and changing the habits and modes of life, affecting what we eat, what we wear and the work and play of the whole nation. Formerly it was an axiom that competition was the life of trade. Under the methods of the present day it would seem to be more appropriate to say that advertising is the life of trade."

Our industry spends a large amount of money for advertising. Every year millions of dollars are used to inform the public of the service gas companies render. "Why advertise" is not a timely topic; we are sold on its advantages and its limitations. "What to advertise" is the problem.

"Don't delay. Advertise something, but, by all means, advertise!" is not a sound merchandising theory. It is verbosity. Each gas company is faced with the problem of finding something big enough and broad enough to represent gas service. That many have found this essential factor is proved by the excellent advertising of our member companies.

The President's sentence, "It makes new thoughts, new desires and new actions," points the way. The people are accustomed to educational advertising; they look for something new in all advertising; they want to be told and taught.

Why Who's Who?

THE Who's Who page of THE MONTHLY is not an experiment in self-gratification, but is an attempt to center interest on the leaders of our business and their careers. Because they have looked for and found opportunity in the industry and have worked hard to capitalize opportunity, they have been rewarded. They are witness to the greatness of our business, the extent of our growth, and the soundness of our future.

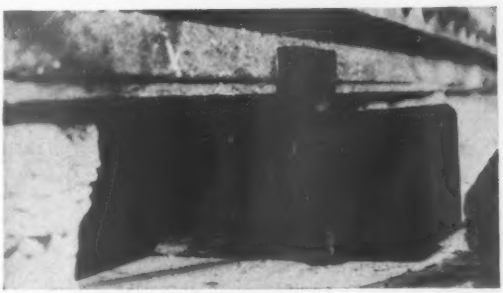
The page will be in vain unless it fires the reader to greater effort to take advantage of the rich opportunities waiting for those who are worthy. Who's Who is a stimulation for achievement.

When a Gas Holder Tilts

A Leaning Five Million Cubic Foot Holder Is an Engineering Problem of No Mean Proportion

By H. L. MASSER
Gas Engineer, Los Angeles Gas and Electric Corp., Los Angeles, Cal.

SEVERAL years ago, the No. seven holder of the Los Angeles Gas and Electric Corporation located at 7th and Alameda Streets, began to tilt seriously, because of settlement of the soil. This holder, which was erected in 1906, is 195 feet in diameter and 226 feet in height, with five lifts, having a gross capacity of 5,019,000 cu.ft. and a net working capacity of 4,905,000 cu.ft.



Close-up of wedges used in raising the gas holder to level

This condition became so aggravated that the rollers running on the guide frame failed to retain their proper relation to the rails on the vertical columns. A very dangerous condition exists under such circumstances, whereby the cups connecting the various sections or lifts of the holder might fail to join properly, and thereby result in some of the upper lifts being dropped abruptly into the holder tank. This would, of course, result in a large loss of gas, but much more important, great damage might result to the holder itself.

To remedy the present situation, it has been necessary to raise the tank and framework of the holder several inches off of its foundation in order to make it level and to plumb the columns which guide the lifts of the holder as they rise out of the tank. In order to do this, grooves about seven inches deep and 12 inches wide by six and one-half feet in length were cut into the concrete foundation under each column by means of air drills. In these grooves was placed a pair of heavy steel tapered wedges, 4 x 5⅝ in. x 5 ft. 6 in. long, having a taper of about one inch to the foot. The lower member of each pair of wedges was placed in the groove under the landing beams of the holder. The upper member of the wedge then projecting outwardly was forced in over the lower wedge by means of a 50-ton hydraulic jack, as far as was possible by this method. To drive the wedges in to their final position and to true up accurately the level of the holder, the wedges were driven home with a 1,000-pound battering ram suspended by cables from the framework of the holder.

Using a jack to force in wedge

By this procedure, the

Battering ram in position for driving in wedge

whole tank, columns and framework of the holder, weighing approximately 5,000,000 pounds, has been raised to a level position. Inasmuch as the columns and guide rails are carried by the holder tank, these naturally were deflected from their true vertical position, with the settlement of the holder tank. The bracing and tie-rods connecting these columns were therefore loosened prior to the raising, in order that the columns might be free to assume a normal position. As the raising is completed and the footing of the columns made level, the tie-rods will again be tightened to bring the columns plumb in all directions, and properly guide the holder lifts.

A job such as this involves numerous incidental problems often times difficult to handle. For example, the tank of this holder contained 8,563,200 gallons of water, weighing approximately 35,750 tons, which it was necessary to remove prior to raising the holder. In order to do this, it was necessary to cut a large opening into the crown of the holder after the gas had been removed from it, and to place upon the water a wooden float carrying a duplex pump, which was operated by compressed air, and pump the water out through a temporary connection made to one of our gas mains, which in turn was connected to the city storm drain emptying into the river. Particular attention had to be given to aerating the water before it was introduced into the storm drain, as this water having been in contact with the gas in the holder for some time, had become thoroughly saturated with gas, and when caused to ripple through pipes, was liable to release the gas, which would mix with the air and produce an explosive mixture, which might result in a serious disaster.

This holder has been in service 20 years. Inspection of the tank and lifts has shown many points where corrosion has seriously attacked the metal. These parts will be patched by welding new plates over them or by additional metal at the thin points. The bottom of the tank will then be thoroughly coated with a coal tar paint, to protect it from the action of the water. Experiments are to be made for the protection of the inner surfaces of the upper lifts of the holder which dip into the water, by placing a quantity of a special oil which will float upon the surface of the water. As the holder is emptied and these lifts drop back into the water, they will coat themselves with this oil, thereby receiving a protective coating against rapid rusting.

New sales room in New York opened by the Ruud Manufacturing Co. It has been called the "most beautiful sales room in the city"

Building a Rate to Build the Business

Observations on a Topic That Is of the Greatest Importance to the Manufactured Gas Industry

By CHARLES S. REED

Consulting Engineer, New York, N. Y. Presented at the Eighth Annual Convention, A. G. A., Atlantic City, N. J.

IN the gas rate business we rarely have the opportunity of building from the ground up, for we already have a structure and our job is a remodeling and supplementing one rather than a true building operation. However, a remodeling job often requires much more care than a new building, for we run the risk of bringing our entire building down on top of us.

C. S. Reed

On examining into the details of our present structure, we find it is a queer-looking thing, as an almost universal rule. Imagine for the moment that the foundation of our building represents the gross revenue of the company, the collections from our customers. This revenue foundation supports, first, the walls, which represent the operating expenses and, second, the roof which represents the net earnings or return, our protection and our shelter from the elements.

What does the magnifying glass of a cost analysis reveal? You have often been told that one-third of the customers of the average gas company fail to pay the bare operating expenses necessary to render service to them. On one side of our building, therefore, the foundation supports only one-half of the wall, leaving the remainder of the wall and its portion of the roof as a drag upon the other parts of the building.

The second side of our building represents another thirty per cent of the customers paying operating expenses but not a fair return. On the second side of our building, therefore, the foundation supports the wall but only a small part of the roof.

There is a third group of the customers, comprising another thirty per cent, using from two to ten thousand cubic feet of gas or more a month and constituting what might be called the backbone of the business. These customers contribute enough to not only pay their own way, but to make some contribution over and above a fair return. thus counteracting some of the deficits of the other two classes. On the third side of our building, therefore, we find the foundation not only supporting its share of the wall and roof, but holding up some of the share of the first two sides.

A fourth group of customers, comprising the large hotel and industrial users, also more than pays its own way. Returning to our analogy, we find our fourth foundation supporting its share of wall and roof and also helping to carry the load properly belonging to the first two sides.

If we take any side of our building and make a microscopic anaylsis, we find widely varying conditions as regards individual elements. For instance, on one

company recently analyzed, we found it was losing twelve per cent on some customers using five hundred cubic feet or less of gas each month, even when due consideration was given to the high diversity factor of that type of customer. Also the range of return on customers using five to eight thousand cubic feet per month was from five to twenty-five per cent instead of the fair return of eight per cent. So we not only have unequal loads on our different foundation walls, but variable and uncertain conditions exist in each wall.

If, in our further research for information, we dig down below the foundations in order to find the nature of the soil on which they rest, we find the very opposite of what might be expected from our previous analysis. The ground beneath our building represents competitive conditions, the strength or weakness of which will have as much to do with the size of the foundation and its load as any element which is brought out in a cost analysis. Under the first foundation, the one which is not supporting anything like its share, we find a very firm subsoil. Competition is light as regards this class of business, comprising the small convenience users of our service, and it is well able to pay its own way.

The firm soil continues on under the second side of the building, but under the third side we find it getting weaker due to the competition of coal-fired water heaters, coal ranges and the ever-increasing undermining activities of our electrical brethren. A similar and even more acute situation exists as regards the industrial business forming the fourth side, so that the two foundations which are the main support of our roof of net earnings are the ones most threatened by the unstable subsoil of competition.

There are two ways of tackling our building job. One is to build additions to it in the way of new rates until the shaky portion of our roof is braced by the additional business obtained with these rates. The second method is to remodel the present structure.

In going after the new business we often find competitive conditions are such that we have to cut rates. This cutting of rates often loses as much net revenue from our present customers as we gain by the new business and therefore we are no better off than before. One possible solution for this is class rates and plenty of them. The manager of a combination gas and electric company thinks nothing of having twenty or thirty electrical rates while his gas schedule has only one or two pages. Incidently, sometimes the net earnings of his two departments are in the same ratio. We should have more gas rates. We are justified in selling gas to present customers at $1.00 a thousand and at the same time offering to sell to new customers or for new purposes gas at 50 cents a thousand. Any rate which will pay the additional operating costs and the additional fixed charges plus some small contribution toward the support of the common overhead—our roof of net earnings—can be justified not only from the standpoint of the company but from the standpoint of the customers who are paying the higher price. The only things that we have to keep in mind are the ultimate possibilities of such a rate and the chance of offering different rates to two customers who are in the same line of business and competing with each other. If you have a roof that is in danger of falling and you have a shifty subsoil on which to brace it, you are justified in building only as heavy a foundation for your new walls as the soil will bear. Similarly, in building a gas rate for new business you are justified in asking for only enough revenue foundation to support the added wall of operating expenses, plus its own special fixed costs, plus whatever share of additional net earnings or roof that the subsoil of competition will permit. If 80 cents will more than cover the added cost and overhead of house heating load, we are justified in making a rate which will average that amount, even though our lowest industrial rate is 90 cents or more.

However, new rates for new business

will not prove the salvation of every gas company. Some of them find competition is getting keener as regards the customer using from two to ten thousand cubic feet each month, the group which comprises the third side of our building and which forms the backbone of the business of many a company.

Optional rates have been suggested—not special rates for special classes of business, but optional rates for the larger domestic customers. They do not seem to be the solution. Some doctors tell us all ills and ailments come from the spine and if you have a sore on your little finger they treat your backbone. Possibly they are right and I take no issue with them, but if some one tries to tell me you can cure a backache by rubbing salve on your little finger, I feel justified in making a few remarks. Putting into effect an optional rate that applies to only ten per cent or at the most twenty per cent of your domestic customers is not going to cure the ills of the other eighty per cent or ninety per cent. You are just rubbing a little salve on a small part of your anatomy in the hope of curing an internal trouble in another and more vital part. As long as you are losing money on a big percentage of your customers you must include that loss as a surplus profit in your optional rates and when you do so you make the rate too high to meet competition and get additional business.

However, let me repeat that by optional rates I am not referring to special rates for class business, these latter being very desirable. There is even one condition under which an optional rate might be developed; namely, where a company is willing to forfeit a large part of its net earnings for a year or so by putting in an optional rate, with the understanding that at the end of the trial period either the new rate or the old rate will be abolished.

The ordinary block rate does not appear to offer a solution to our rebuilding problem, for it, too, fails to do justice to the bulk of the customers or to solve our competitive situation.

The plant makes the gas—at what price can it be sold?

This brings us to what is generally known as a service charge but which is more truly a community charge, since it represents part of the customers' share of the common or community expense that forms so large a portion of the cost of utility service. So much has been written and said concerning this form of rate that I will not trouble you with further details but will merely summarize as follows:

THE SERVICE CHARGE

A comparison of the effect of various equivalent rates upon the bills of a number of representative customers, whether made from a cost analysis standpoint, or from the standpoint of justice to the customer, or from the viewpoint of desirability to the customer, or on a competitive basis, will indicate the community charge in some form or other as the only solution to our remodeling problem. It is the only type of rate which adds to the revenue foundations under both the first and second sides of our building and makes them carry some share of the roof.

Immediately, however, we run against the snag of the supposed unpopularity of that form of rate. Many of you gas men tell us it is not expedient to put any form

of community charge into effect. How do you know? What experience have you had with the installation of community charges? There will be plenty of answers to that question so we will limit it by excluding any so-called service charges that were installed as increases in the average overall rate, service charges that came as added charges for which the public received nothing additional. We will further limit the question by excluding all service charges of less than $1 per month and then we will ask the question again: "How many of you gas men have gone to your domestic customers on an even trading basis and offered to swap a gas rate of less than $1 per thousand in exchange for a community charge of over $1 a month?" How many of you have given your customers an even break, a chance to learn that a community charge in its true form means a low commodity rate and an opportunity for the poor man to make his house as clean of the cinders and dirt of other fuels as the home of the well-to-do citizen. My one suggestion today is that you try such a method, not necessarily publicly at first, but privately on a small group of friendly customers. including some that will have to pay more on the community rate. Calculate a rate which will yield the same total revenue as you are now getting from your domestic business but which will have a community charge of over $1 a month. Explain to the small group of customers that the increases in some bills are not going into the money bags of the company but are going back to the community in the shape of decreases in the bills of the other customers. Show them that a $1.50 community charge will not increase any more bills than a 25-cent service charge.

After you have experimented on the small group of customers, explain the trial rate to some of your employees and get their reaction. Then, and not until then, try it on your company officials. The reason for suggesting this queer order of things—customer first, then employee and then officials, is that experience has taught me it is easier to sell a 2-dollar community charge to the crankiest customer on the mains of a gas company than it is to sell a 25-cent service charge to the average gas company official. The customer looks at the question from the viewpoint of the service he is getting and the chances of more service and cannot help but choose a community rate as being best for his town. On the other hand, the company official seems to look only at the grief that he thinks will come to him. Therefore it is suggested that you try it on some customers first and learn it is not as hard to sell as you imagine.

Sometimes the community charge is made a little more palatable by sugar coating it in a first few hundred rate. The only objection to this scheme is the tendency to include too much gas for too little money and by the time four or five hundred feet of gas have been included in the minimum charge, much of the community effect is nullified. It is all right to sugar-coat the pill, but don't add so much sugar that you nullify the medicine and give the patient indigestion.

Twenty minutes of my time have passed and no mention has been made of three-part rates. I see no necessity for mentioning them. If you sell a community charge of more than $1 a month, you won't have to sell a three-part rate. It will sell itself. One of the arguments you will have to meet when you sell the community charge is that the customer requiring larger mains and meters and who uses gas at high speed should pay a bigger community charge than the small demand customer. Your only answer is to graduate the community charge according to the amount of service required and immediately you have the three-part principles. Possibly the means of graduation will be only an approximate one at first, such as meter size, floor area or number of rooms, for these methods are justified until some such time as your

(Continued on page 740)

The holder and the playground that has been established in Salt Lake City

Holders, Playgrounds and Public Relations

The Utah Gas and Coke Company Finds That the Salt Lake City Public Likes to Be Pleased

MAKING an asset of a liability is not necessarily a sleight-of-hand performance; installing a holder in a residential district does not call for any magic, either, as the Utah Gas & Coke Company found out recently.

The installation of this holder proved to be a matter of public relations. Of necessity, the holder location chosen had to be close to and practically in a section of the city known as Sugar House in which the people have stubbornly insisted upon no disfiguring commercial institutions or plants of any description. Fortunately the holder loaned itself to harmony with surroundings, at least to a greater extent than the ordinary gas holder.

In this particular installation the holder is located at some distance from the compressor installation and no activities whatever are carried on at the site of the holder, even the governors being located in underground pits at some distance from the holder. The lot is approximately 120 feet square, the holder itself being 60 feet in diameter. The holder was placed in one corner of the lot with tall trees on all sides of it. This left the entire surface of the lot, except a circle of about 40 feet in diameter, for use as playgrounds.

Coincident with the announcement that a gas holder would be built in this location, it was stated there would be installed a public playground with necessary equipment for use by anyone who wished to use it. There was immediately a storm of protest from the neighborhood, even though the nearest playground was over two miles away. However, upon showing the protestants the plans and assuring them that no operations whatever would be carried on after the completion of the holder and that the holder itself would be made to harmonize with its surroundings, the protests were withdrawn. How the company kept its word to the protestants is ably illustrated in the accompanying photographs.

On the day the playground was opened over 200 youngsters enjoyed its pleasures from the time of opening until darkness made further play impossible. Every day since, the grounds have been well filled with youngsters and in many cases the

Another view of the holder

youngsters are accompanied by parents who find opportunity to rest in the shade while the children are enjoying the playground.

The company has been very highly complimented by residents of the neighborhood and by the public press upon the installation.

Now, more than ever before, the company believes that a public utility should accommodate itself insofar as possible with the wants, desires, and necessities of the community which it serves, according to Geo. R. Horning, vice-president and general manager. He is satisfied that the money appropriated by the company for the installation of the playground in question will be returned many times over in the betterment of the public relations.

Who Will Be the Lucky One?

A Pie-Worshipper Comments on a Successful Four-Day Cooking School Held in Portland

By JOHN H. HARTOG
Sales Manager, Portland Gas & Coke Co.

THE picture shows part of the expectant crowd, all anxiously waiting to find out which one in the multitude is going to be the winner of the $160 gas range. As the large hall seats people on four sides, the photograph only shows part of the attendance.

The range was offered by the Portland Gas & Coke Company as grand prize in the contest for the best cake. This contest, handled by the Portland Women's Club, was the climax of the four-day cooking school sponsored by the Portland *Telegram*.

The second prize for the cakes was a radiant heater, the first prize for the best pie a sweeper and the prize for the best cookies a reminder clock. In the background is shown one of the many tables displaying the splendid entries.

What puzzles a mere man is how on earth the women can tell the difference between one cake and another, for not being a lover of cake they all look alike to me. In the same way, being a worshipper of pies, the wonderful contributions made by these women were certainly a temptation to over-eat.

The room in which the cooking demonstrations were given was the ballroom in the beautiful new Elks Temple right below the lodge room shown in the picture.

The group that waited for the announcement of the winner

"I Buy Comfort, Not Fuel"

Mr. Average User Considers the Many Advantages of the Gas Fired House Heating Boiler

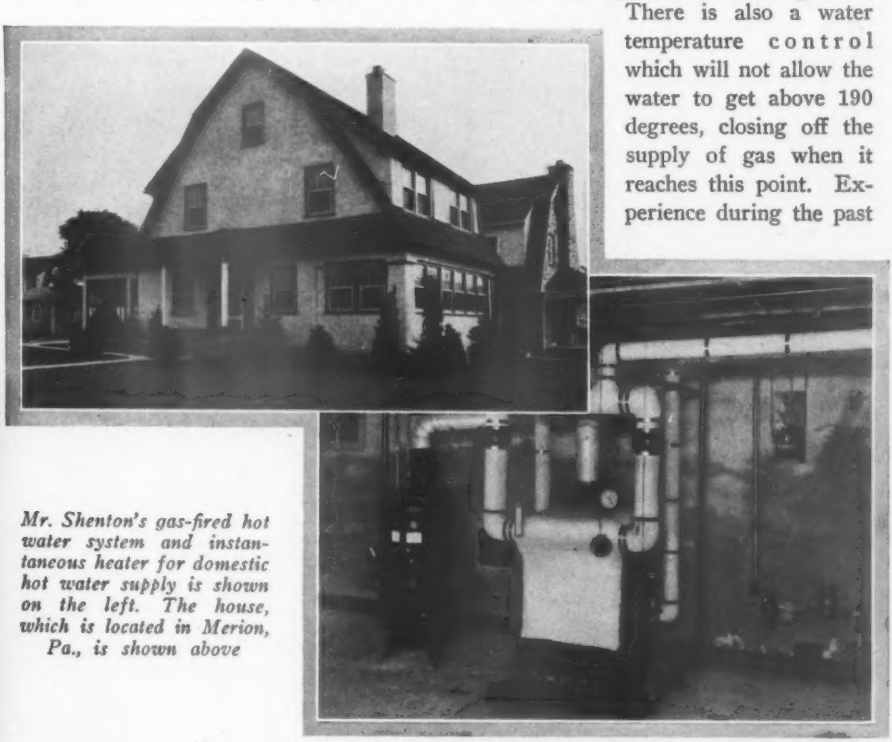
By H. E. SHENTON
President, Philadelphia Meter Company

THE purpose of this article is not to deal with futures or possibilities, but to put in cold print the experience of heating a home with a gas-fired boiler, as certified to by the usual number of receipted gas bills.

Accompanying is a picture of the house so heated, which contains nine rooms and a heated garage, the front or long side of the house facing directly to the west.

This house is heated with a "hot water tank-in-the-basement system" and is known as a "closed system," the expansion tank being located immediately above the boiler. In the "open system" the tank is at the highest point and is open to the atmosphere. In the "closed system" we have the weight of the water, which when heated produces a more rapid circulation giving a greater efficiency over the "open system." To provide for the increased pressure caused by this heating, we have the system equipped with a No. 2 "Red Top" relief valve, which will function whenever the pressure reaches 30 pounds, affording protection to the boiler and radiators.

The boiler is equipped with six gas burners. Room temperature is controlled by a thermostat placed in the dining room. There is also a water temperature control which will not allow the water to get above 190 degrees, closing off the supply of gas when it reaches this point. Experience during the past



Mr. Shenton's gas-fired hot water system and instantaneous heater for domestic hot water supply is shown on the left. The house, which is located in Merion, Pa., is shown above

winter shows that the water was never hotter than 160 degrees on the coldest days, thus making this control an additional safety feature only. There are 644 feet of radiation, all radiators of the Coutez type. A separate gas meter is used on the heater line, thus eliminating all calculations as to what might have been consumed by other appliances—an instanteous heater for hot water, a fireplace heater and the kitchen gas range being connected to a separate meter.

Another picture shows the cellar, heater, piping, etc. All pipes are insulated. Windows and doors are not weather stripped. All flooring is double throughout. There are 32 windows, and 4 doors leading to the outside. The cellar temperature was about 60 degrees.

THE COST

Now I presume you are mostly interested in the cost. This is perfectly natural, so I have kept monthly charts similar to the one for February, 1926, which is reproduced. You will note that a reading is made at 8 a. m. each day. You will also observe that the average outside temperature is given for each day; also the direction of the wind and state of weather prevailing. Then you will note the amount of gas used each twenty-four hours. By a study of this chart you will see how the consumption of gas varies with the change of temperature and oftentimes by the direction of the wind and its force.

The gas is supplied by the Counties Gas and Electric Co. of Ardmore, Pa., and there is a sliding rate for quantity. It starts at $1.10 for the first 10,000 cubic feet, reducing then until it reaches a rate of 80 cents per 1,000 cubic feet for all gas over 50,000 cubic feet. This makes the average for this particular month (February) 92 cents per thousand.

The cost each month was as follows:

1925	
October	$12.10
November	32.67
December	52.56
1926	
January	$83.52
February	70.52
March	68.85
April	47.43

Note: All bills for gas company billing periods.

I feel that by now you have been much interested in this description, but the reaction comes when I place before you the total cost, which has been the object you have been looking for. But when I recall the entire absence of thought in providing coal in advance, no ashes, no dirt, and above all an evenly heated house, then these figures fade into insignificance.

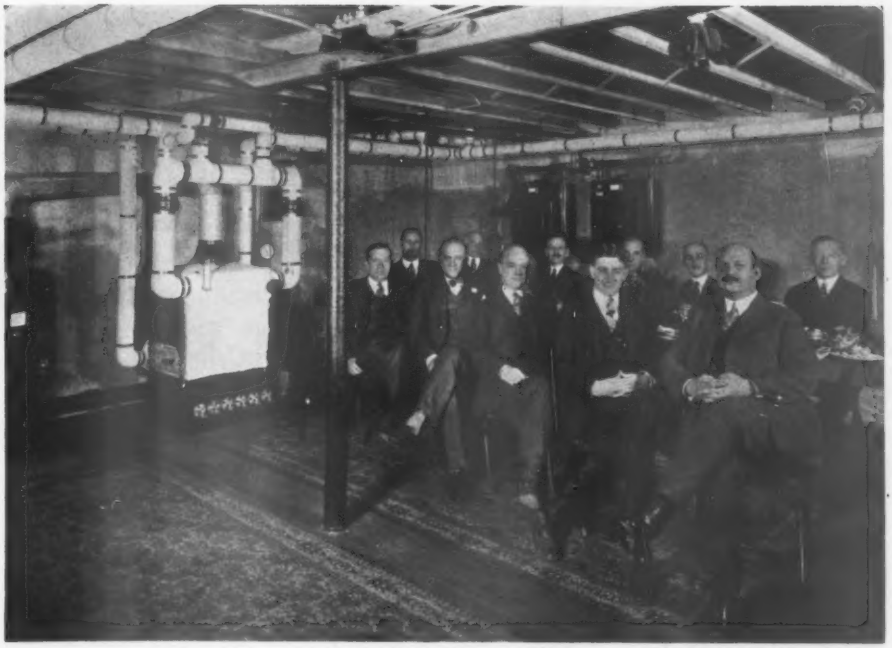
SAVING IN LABOR

The pilots were lit on September 23, 1925 and turned off April 18, 1926, thus making a heating period of seven months. The thermostat was set for 70 degrees from 6 a. m. to 11 p. m., it then auto-

Mr. Shenton's Gas Heating Log for February, 1926

Date	8 A.M. Meter Index	Weather	Avg. Outside Tem.	Wind	Cu. Ft. Used	Date	8 A.M. Meter Index	Weather	Avg. Outside Tem.	Wind	Cu. Ft. Used
1	2353	Cloudy	35	N. E.-E.	2600	15	2780	Cloudy	44	S. W.-W.	2200
2	2379	Cloudy	39	E.-S. E.	2400	16	2802	Clear	35	W.	3200
3	2403	Cloudy	34	S. E.-N. E.	3300	17	2834	Clear	34	W.	2400
4	2436	Cloudy	30	E.-N. W.	3500	18	2858	Cloudy	44	S. W.-S.	1700
5	2471	Clear	30	N. W.-W.	3200	19	2875	Cloudy	39	S. E.-N. W.	3100
6	2503	Clear	32	W.-W.	2800	20	2906	Clear	30	W.	2700
7	2531	Cloudy	40	S. W.-S.	2600	21	2933	Cloudy	35	W.-S. W.	2800
8	2557	Cloudy	32	S. W.-S. W.	3200	22	2961	Cloudy	36	S. W.	2600
*9	2589	Cloudy	27	S. E.-N. E.	3400	†23	2987	Clear	30	W.	2800
10	2623	Cloudy	24	N. E.-N. W.	3900	24	3015	Clear	32	S. W.-S. E.	2500
11	2662	Clear	18	N. W.-N.	3800	25	3040	Cloudy	42	E.-S.	2200
12	2700	Clear	27	W.	2800	26	3062	Clear	44	W.	2500
13	2728	Cloudy	34	S. W.-S.	2800	27	3087	Clear	34	W.	3500
14	2756	Cloudy	36	S.-W.	2400	28	3122	Clear	28	N. W.-S.W.	2000

Total Gas Consumption, 76,900 feet at 92c per M.....$70.52 *10" snow. † 5" snow.



This is what happens when gas is used for heating the home. Mr. Shenton appears in the foreground at the right

matically reducing the temperature to 60 degrees from 11 p. m. to 6 p. m. The cost for the entire seven months was $367.65.

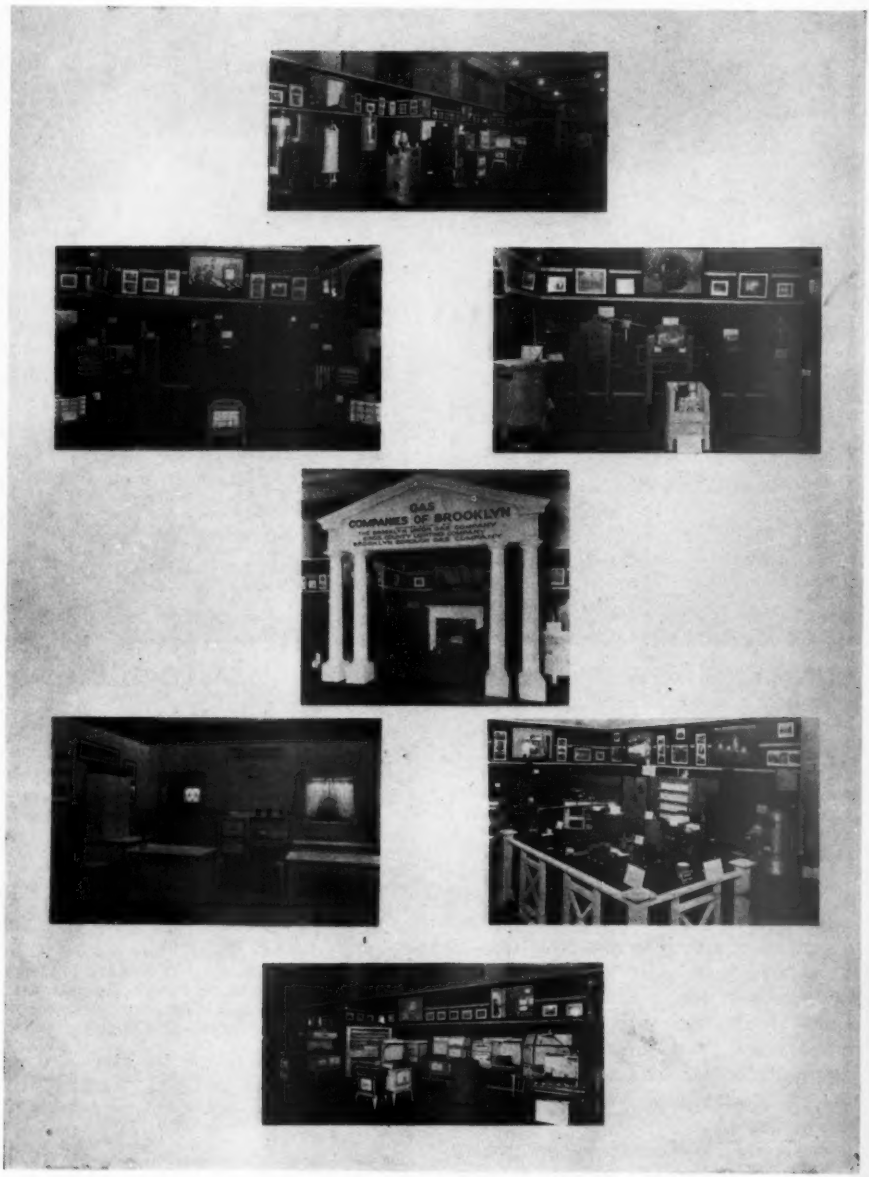
CLEANLINESS AND HEALTH

I am not an enemy of coal, but I am in opposition to unnecessary labor. In these busy days it seems foolish to spend so much time attending to a coal furance. It releases you, your wife, and even your servant for the more important duties of life, and gives you an evenly heated home at all times devoid of all labor and trouble. Gas-fired boilers make for a cleaner and certainly a more healthy home.

If we could get the viewpoint that we do not buy coal or gas, but comfort, then the difference in cost between the commodities employed would vanish in thin air.

What you get and not what you spend is the gauge of all your comforts.

This article should be of particular interest to the gas industry, coming as it does from a man out in the business. Mr. Shenton's company sells the Trident water meter, manufactured by the Neptune Meter Company, New York, which also manufactures the Red Top relief valve invented by Mr. Shenton.



VISTA OF GAS APPLIANCES AT THE BROOKLYN EXPOSITION

The pictures show portions of the exhibit of The Brooklyn Union Gas Company, The Kings County Lighting Company, and The Brooklyn Borough Gas Company at the recent exposition held by Brooklyn industries. Gas appliances of every type, from large industrial ovens to small domestic space heaters, were in view.

Brooklyn Learns More About Gas

Industrial Exposition Held Recently Gives Three Local Companies Opportunity to Tell Their Story

THE Brooklyn Industrial Exposition closed its last day on Saturday, Oct. 9th, in the Grand Central Palace in Manhattan after a successful two weeks. This is the first time the exposition has been held outside of Brooklyn and this event is notable in this instance because the great public service organizations of Brooklyn went along with the manufacturers and merchants as an intimate part of the life of Brooklyn without which such expositions lose much of their interest to the average visitor.

The gas utilities service was represented by a combined exhibit under the associated management of Brooklyn's three gas companies, The Brooklyn Union Gas Company, The Kings County Lighting Company and The Brooklyn Borough Gas Company.

The exhibit was installed upon a scale in keeping with the magnitude and importance of this great section of New York City. It is safe to say that it was undoubtedly the most comprehensive display of those features of the gas industry with which the public is most interested —gas appliances and their operation— that has been placed in a single exhibit anywhere in the country. It included something representative of every type of gas application in general use today.

The exhibit took up the entire north alcove of the main chamber of the Grand Central Palace. Installed in a completeness that permitted an actual working demonstration of each typical appliance, it appealed to those who attended as well worth the visit for its sake alone.

The gas appliances were arranged in bays, starting with those pertaining to industrial appliances and graduating through related new business activities to a most excellent home service demonstration that functioned with great popularity at the far end. Throughout the exhibit as a background a vast number of photographic copies of actual operating gas installations of the three associated companies were shown, each photograph illustrating some one or more of the actual appliances installed in the exhibit.

Industrial gas applications were represented by a variety of burners, ovens, forges, furnaces, boilers, and special fires, giving an idea of the multitude of operations in which gas is becoming the paramount fuel. Both high pressure and low pressure fires were shown with the most up-to-date inspirators and devices of the industry. Restaurant and commercial applications were intermingled with the industrial display and, best of all, the demonstrators were men whose work each day familiarizes them with all the industries to which gas fuel appeals. Space and house heating appliances comprising central gas fired steam, hot water or hot air plants, garage heaters, and gas steam radiators were displayed along with room heating units such as radiant gas fires and other heaters of approved design. House heating engineers were in attendance to explain and calculate radiation for those who were interested in this phase of gas service.

The ordinary household fires consisting of kitchen stoves and hot water heaters were shown in a large section of the exhibit and the display comprised the particular lines of gas ranges sold by the three Brooklyn companies. The variety of types left the visitor with little reason to look elsewhere in order to suit himself in selecting a range.

The home service divisions of each of the companies took turns at demonstrating the fine qualities of the gas range as the best cooking device of modern times. Delicacies such as cookies, cakes, pies and other pastries were prepared by the com-

(Continued on page 740)

Employees One Big Family, Says Cortelyou

THE human side of a great corporation, usually hidden as the thoughts of a Hindu god, is revealed in the following tribute to loyalty, by George B. Cortelyou, President, The Consolidated Gas Company of New York, to the stockholders of the company.

"Arthur Foote was employed a few days ago as an office boy at our General Office.

"John O'Connell was employed on Feb. 10, 1856, at our 21st Street Station.

"From this it may be seen that our youngest employee in length of service is a few days and our oldest in point of service is seventy years at the same plant.

"No company ever had a more loyal and devoted body of employees than the Consolidated and its affiliated gas and electric companies. I like to think of them (nearly 30,000) as in a sense members of one big family; of different branches, it is true, but all in some way related and all the objects of our interest and concern. If such is the relation of those who have been with us a decade, or a dozen or fifteen years, how much more is it so of those who have been together for longer periods and specially when the association rounds out into a quarter of a century or more.

"Analysis of the roster of our Quarter Century Club shows: One employee with a record of seventy years of faithful service; three employees with records of sixty years of faithful service; thirteen employees with records of fifty-five years of faithful service; seventeen employees with records of fifty years of faithful service; twenty-three employees with records of forty-five years of faithful service; seventy-one employees with records of forty years of faithful service; 229 employees with records of thirty-five years of faithful service; 281 employees with records of thirty years of faithful service; 396 employees with records of twenty-five years of faithful service.

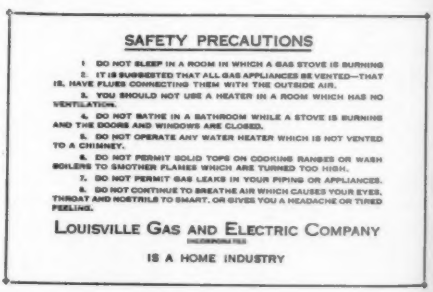
"Through our various employees' societies, medical and financial aid is rendered and social and athletic activities encouraged. Such activities do much toward keeping our splendid personnel intact."

Preaching Safety on the Back of the Bill

ANY article in common use may become hazardous if used carelessly or incorrectly says the National Safety Council. With this idea in mind, the Louisville Gas and Electric Company has inaugurated the practice of printing safety messages of the back of the monthly service bills. The illustration on this page is representative of the message used, except that those pertaining to gas are sent out during the colder months, and those relating to electricity (the company is a combination one) are sent out during the other six months of the year.

Heretofore, many executives of both gas and electric companies have hesitated to give publicity to such precautions, because they were of the opinion that it would needlessly frighten many of the customers and cause them to stop using various appliances as a natural though ineffective safety measure. The experience of the Louisville Company seems to prove that the public is no more apt to be frightened into giving up the use of gas appliances, than they are frightened into giving up the use of automobiles through the publicity given to the automobile accidents.

The precautions pertaining to gas are copies made from the report of the technical subcommittee that made an investigation of asphyxiations in Los Angeles the early part of 1926.


SAFETY PRECAUTIONS

1. DO NOT SLEEP IN A ROOM IN WHICH A GAS STOVE IS BURNING
2. IT IS SUGGESTED THAT ALL GAS APPLIANCES BE VENTED—THAT IS, HAVE FLUES CONNECTING THEM WITH THE OUTSIDE AIR.
3. YOU SHOULD NOT USE A HEATER IN A ROOM WHICH HAS NO VENTILATION.
4. DO NOT BATHE IN A BATHROOM WHILE A STOVE IS BURNING AND THE DOORS AND WINDOWS ARE CLOSED.
5. DO NOT OPERATE ANY WATER HEATER WHICH IS NOT VENTED TO A CHIMNEY.
6. DO NOT PERMIT SOLID TOPS ON COOKING RANGES OR WASH BOILERS TO SMOTHER FLAMES WHICH ARE TURNED TOO HIGH.
7. DO NOT PERMIT GAS LEAKS IN YOUR PIPING OR APPLIANCES.
8. DO NOT CONTINUE TO BREATHE AIR WHICH CAUSES YOUR EYES, THROAT AND NOSTRILS TO SMART, OR GIVES YOU A HEADACHE OR TIRED FEELING.

LOUISVILLE GAS AND ELECTRIC COMPANY

IS A HOME INDUSTRY

Exhausting Burned Products from Gas Appliances

PREPARED BY
Portland UTILIZATION LABORATORY PORTLAND GAS & COKE CO. Oregon

NOTE BY C. G. SEGELER

THAN flues and flue connections, there is no more vexing problem, nor one which provides more controversial discussion among gas utilization engineers.

Where some gas companies vent all appliances, others consider it advisable only to vent those which are automatic in operation or which have a large gas consumption. This article presents in a very valuable way the practice now in use in the Northwest and while the reader may not agree with all of the rules and suggestions, there can be no question that they deserve a careful study.

Supplementing the unique work on "Permissable Flue Areas for Gas Practice" which was described in a previous issue of the A. G. A. Monthly, the Utilization Laboratory of the Portland Gas and Coke Company presents in the accompanying article their rules for the use and construction of vent connections and flues formulated as a result of careful study of those factors which tend to promote the most satisfactory operation and the longest life.

THE object of this summary of experience is to set forth in logical order the principal considerations which should be taken into account in connection with exhausting burned products from gas appliances.

DEFINITIONS

A gas appliance vent as herein defined is a conduit or pipe designed to function as a chimney or stack to convey the products of combustion from the vent connection of a gas utilizer to the outside atmosphere.

A gas appliance vent connection is a pipe connected to an appliance for the purpose of carrying the products of combustion from the appliance to a chimney, stack or vent.

A flue as defined herein consists of the entire passage for exhaust gases between the gas appliance vent ell and the outside atmosphere.

GENERAL CONSIDERATIONS

An open flame properly adjusted gives off no harmful products.

This may or may not be true when combustion occurs in a burner box, or where the flame comes in contact with some material substance.

Burned products discharged into a building sometimes cause damage from condensation of moisture.

The idea underlying a satisfactory flue must be that it supply sufficient area to discharge properly all exhaust products and maintain a reasonably constant draft under the given conditions of demand.

All flues should be smooth, warm, direct, and duly protected from stoppage. Flues essentially cold from immediate contact with masonary walls or other mediums should not be used.

A long flue may result in two disadvantages:

a. Undue friction of the passage of gases (this is not important except where gases are cooled to low temperatures). As the temperature differential is exhausted, the additional length merely causes waste friction.

b. If products are cooled below the temperature of the surrounding atmosphere, the cold portion of the flue has an intrinsic tendency toward backdraft.

Draft in a chimney increases as the square root of the height of the chimney. For gas practice, an approximate formula showing this relation is $A=\frac{KE}{C\sqrt{H}}$, in which A equals the flue area in square inches, H is the height from the burners to the top of the flue in feet, E is the total B.t.u. per hour generated in the firebox, K is a co-efficient whose value is one for small installations and which grows progressively less than one as the

size of the installation increases. C is a co-efficient varying from 800 for retarding features such as long connections, exposure to cooling, flat shape of flue, offsets, etc., to 1200 where conditions are favorable. This formula is empirical and is inserted only to show the relationship of the various constituent factors.

RULES FOR BOTH VENTS AND VENT CONNECTIONS

It is recommended that metal vents and vent connections constructed of sheet copper be not lighter than 14 oz. per sq. ft., or if of Monel metal, not lighter than 24 gauge (must not be under 26 gauge). The edges of the sheet metal should be substantially fastened together to form a pipe, with a rivet at each end of the seam and each length of pipe should be riveted together with at least two rivets.

Lengths of pipes should be lapped at least 1½ inches.

When in place, male ends should be pointed down.

No joints or offsets in the vent in excess of 60 deg. from the vertical should be used in concealed work. Not less than one inch pitch should ordinarily be used, but one-quarter inch pitch is the real minimum that may be used where vent pipe is exposed and accessible to inspection.

All bends and offsets should be one piece construction, and should be securely strapped at a point within two inches of each fitting.

All flashing, metal bands, canopies, etc., coming in contact with metal vents or vent connections should be of the same material as the rest of the construction.

Hand or portable gas appliances having a consumption not to exceed 15 cu.ft. per hour, or hotplates and gas-fired appliances such as blow torches, washing machines, gas irons, or other apparatus, the location of which must be changed during the course of operation, may be operated without use of vents, provided the room in which they are to be used is adequately ventilated. No house heating appliance except those with a rating under 15 cu.ft. per hour should be operated without a vent.

Open fireplace heaters should be vented into a canopy or fire place chimney the area of the throat of which should not be less than 1/30 of the area of the fireplace or canopy opening.

A horizontal run of vent plus vent connection should never exceed the vertical rise of vent plus vent connection.

Sharp bends in vents or vent connections should not be allowed.

Vents or vent connections should not terminate immediately after projecting through an external wall or window.

An independent flue is always desirable.

NOTES ON VENTS AND VENT CONNECTIONS

The draft in the flue can be tested by holding a lighted piece of paper in a vent opening or clean-out. The draft, to be satisfactory, should exert a strong pull on the burning paper, which should be sufficient to draw up the burned particles.

A vent connection should not enter a flue directly opposite another vent connection coming in from another appliance, otherwise the draft in both vents may be poor. If it should be necessary to run a vent into a flue at the same level as another vent, the two should be made to run in at right angles to each other; but this is to be avoided when possible.

When other appliances vent into a flue, their character and the probable quantity of products which they will carry should be given consideration. Careful draft tests will be particularly useful.

The actual installation of the vent and vent connection must be carefully made. Improperly installed they may lead to serious results.

RULES FOR VENTS

Any chimney or stack acceptable for the use of solid fuel appliances is a suitable vent for gas-burning appliances up to the capacity of the chimney.

All chimneys except those connected to fireplaces should have a metal clean-out

door at the base of each flue. No vent inlet should be permitted to enter a chimney at a point closer than 12 in. above such clean-out door. This means that no vent opening should be allowed within two ft. of the bottom of a brick chimney.

Copper vents should start at a point at least 12 in. below the inlet, and the bottom should be composed of a cap of dimensions such as to fit tightly on the bottom length of pipe.

This cap should be concave upward and should have a copper or galvanized iron pipe of diameter not less than 1¼ in. extending in a vertical direction and terminating under the building in such manner that condensation which might collect in the vent will be carried off. Where vents are installed in inside walls, drain pipe may be omitted.

Metal vent inlets should be of one piece construction in the form of a tee, side outlet of which should extend directly out to receive vent connections.

Vent inlets of copper should be constructed of material weighing not less than 16 oz. per sq.ft., or if of Monel metal not less than 22 gauge. Inlets should be flanged to the vent proper by laps of not less than 1½ in., which should be soldered and riveted with copper rivets not more than 2 in. apart around the entire circumference.

These inlets should project out through the finished wall and should be slightly flared to receive the connection from the appliance.

Inlets to chimneys should be fitted with a snugly fitting metal collar or terra cotta thimble to permit the vent connection being readily removed for inspection purposes without disturbing the metal collar, which should be securely cemented to the vent in a water tight, spark proof manner.

Gas vents should terminate not less than three feet above a flat roof or two feet above the highest point of a pitched roof.

If a vent projects more than 6 feet above the point where it comes through the roof it should be substantially braced.

Gas-fired house heating appliances should not be connected to gas vents which are enclosed in partitions except that part of such partitions surrounding the vent as is constructed of metal lath, plaster, and studding, or unless woodwork exposed within the cavity is protected by ¼ in. air cell asbestos or equal insulator.

When the surface of a gas vent projects into the room or is even with the lath and plaster, it should be furred over in such way that the finished lath and plaster will not come in contact with the vent proper.

The combined area of inlets into gas vents should not ordinarily exceed cross-sectional area of vent.

All vents should be properly flashed and counter flashed in passing through the roof.

Though it is not recommended, gas vents may be constructed of terra cotta or cement tile having walls not thinner than ¾ in. and with sections so arranged that they are jointed together in a fume- and fire-proof manner. The tile and the joints should be impervious to water. Only tile should be used which has the approval of the Bureau of Buildings.

NOTES ON VENTS

Chimneys should preferably be located inside the building, because the interior of the chimney will be warmer than if located on an exterior wall, with a resulting better draft. An outside flue should be treated with suspicion. Particularly bad is the case where three sides of the chimney are outside the building wall.

A high bluff or nearby trees will frequently cause as much trouble in a chimney as will insufficient height above the ridge pole. In such cases a chimney top of some kind may overcome the difficulty.

A chimney not extending clear down into the basement, but ending above the first floor, will probably give trouble, due to seepage of condensation through the brick. Such a flue should not be used.

The draft in a fireplace flue will seldom be satisfactory for a gas vent.

The space underneath a fireplace ordinarily has no connection with a flue and a vent connection should not be attached to it.

Condensation on the inside of the chimney is likely to soak through and do damage unless the inside of the flue is plastered with a rich cement or other fairly impervious mortar, and the wall furred out around the chimney before the lath and plaster are put on.

Plaster should never be applied directly to a chimney used as a gas vent.

The draft in a chimney may be tested by holding a lighted piece of paper in the clean-out. This draft to be satisfactory should exert a strong pull on the paper and should be sufficient to draw out the burned particles.

If a vent has been used in connection with solid fuel appliances, investigation should show that it is clear of soot. If this is not done it will sometimes develop that the draft will be all right for a few days and then give trouble, as the soot is loosened by the products of combustion and will accumulate to the extent of checking the draft.

Unused flue connections to a chimney should be tightly sealed. These other connections when only partly opened will often leak enough air to kill the draft of a flue and are the secret of many furnace failures.

RULES FOR VENT CONNECTIONS

Connections, if made of steel, should not be less than No. 28 gauge U. S. Standard black or galvanized iron. If made of terra cotta or cement products the same considerations apply as to vents. Sheet steel vent connections should not be used for house heating appliances.

Vent connections for gas house-heating appliances should be constructed of sheet copper weighing not less than 14 oz. per sq.ft., or if of Monel metal, not less than 24 gauge (must not be under 26 gauge), or of terra cotta or cement tile such as may be used in vents, or of other materials having suitable corrosion resisting properties.

All joints and seams should be water tight.

If copper vent connections are installed only copper rivets should be used in making the joints, as steel or iron rivets soon rust out.

Vent connections should be properly connected to a gas vent.

No tight dampers should be permitted on any gas appliances and no dampers of any sort should be used on water heating or house heating appliances.

All types of appliances having an enclosed burner box should be provided with a suitable draft hood or down draft check.

The distance between any vent connection and unprotected woodwork should not be less than four inches. Protected woodwork is defined as woodwork covered by sheet metal or other incombustible material, to width not less than 1½ times the breadth of vent, with at least one-half inch of air space provided between the shield and woodwork. The distance between protected woodwork and a vent connection should not be less than two inches.

It is well for vent connections to pitch upward toward the vent one inch per foot of run unless very short, when they may drain downward toward the vent. Pitch must not be less than ¼ inch per foot. Drips in vent connections are required at the lowest point which should be at the vent ell of the appliance.

Vent connections should be securely supported by means of substantial straps or hangers at intervals of not ordinarily more than four feet on all horizontal runs. This figure should never be more than six feet. Double straps should be used frequently to prevent swaying.

The fit between a vent connection and chimney inlet should be made snug and tight.

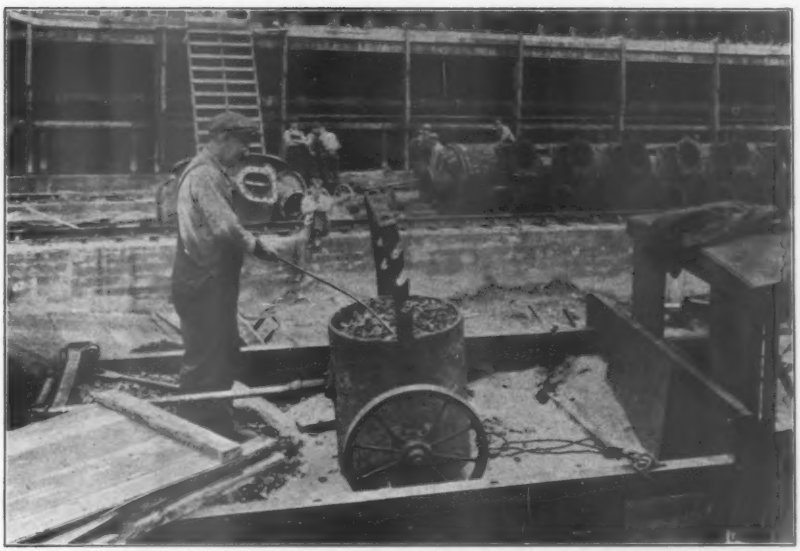
Vent connections should be erected in as direct a manner as possible, but may

(Continued on page 734)

The Fires That Never Go Out

In 1823 a fire was started at the plant of The New York Gas Light Company, then at Canal and Rhyder Streets. The flame that sprang into life more than a century ago still burns, for when Consolidated Gas Company's 21st Street plant was opened in 1848, live coals were carried from the Canal Street plant to start the fire there.

On August 26, 1926, live coals were taken from the 21st Street fires to start the fires at the new Hunt's Point plant, to carry on the tradition that the fire must never go out!



Top: Earl L. Griffith, field construction engineer at the Hunt's Point Station of the Consolidated Gas Company of New York, carrying the live coals from the salamander to the oven.

Center: Live coals of fire taken from the company's 21st Street plant.

Bottom: H. M. Himsworth, general operating superintendent, throwing the fire into the coke oven.

Exhausting Burned Products

(Continued from page 732)

pass through floors, walls, or partitions constructed wholly or partly of wood if they are encased by a ring or casing by some hard, incombustible material at least 1 inch in thickness entirely surrounding the pipe where it passes through the woodwork.

Otherwise they should be surrounded by vented safety thimble made of sheet metal in two rings not less than 1 inch apart and firmly fixed in position. If the thimble exceeds 12 inches in length, the outer ring should be covered with a casing of hard, incombustible material not less than one inch in thickness.

Vent connections should not pass through closets or concealed spaces other than partitions or floors.

Vent connections should be accessible for inspection and cleaning.

Gas water heaters and gas ranges should not ordinarily be provided with vent connections smaller than the outlet on the appliances.

After a vent connection is installed, the draft should always be tried with a burning paper held up under the back draft check. An installation should not be left as ready for use unless the draft is good.

Dependence should not be placed in solder when connecting strapping or wiring up vent connections, as in unusual cases this may be melted.

NOTES ON VENT CONNECTIONS

On the whole, copper vent connections have proven that they will outlast five ordinary galvanized vent connections. Black iron vent connections do not resist condensation and joints cannot be soldered. Galvanized iron vents seldom last over two years. Terra cotta or cement vents are durable, but are made in poor shapes and are difficult to install with tight joints.

Copper will ordinarily last 8 to 10 years, costs no more than terra cotta, and about 1½ times as much as galvanized iron. Monel metal is the most desirable vent metal known, but its expanse is too great for general commercial usage.

When using a vent to which other appliances are connected, make an independent connection. Try to avoid joining vent connections, although separate vent connections from different appliances may if necessary be hooked together before entering the vent so as to simplify the connection at the flue. In this case precautions should be taken to use full "Y" fittings of sufficient size.

To reduce friction as much as possible in vent connections all unnecessary bends should be eliminated and those used should be graded instead of sharp.

When a 45 deg. elbow may be used, a 90 deg. elbow should not be tolerated. Ninety deg. elbows should be made up of several joints and should not be the sharp turn elbows sometimes observed.

Care should be taken to see that the vent connection has no condensation traps in the line.

Where the horizontal run exceeds 20 feet in length, the job is entitled to consideration.

A vent connection is sometimes shoved so far into a chimney as to stop up its end. Great care should be taken to prevent this occurrence.

If a vent connection were to enter near the very bottom of a vent it would be easily stopped up by soot, sand, or other substance dropping down.

The matter of connecting, strapping, and wiring up vent connections is usually given but little thought. When the occasional serious consequences of a vent connection failure are noted, the importance of careful attention to the matter of securely installing them is appreciated. Care and judgment are required in each installation.

Those measuring for vent connections should show all joints difficult of access put together in the shop, and leave only the minimum of joints to be made in the field, and those to be thus made should

(Continued on page 742)

Case-Hardening in Gas-Heated Furnaces

Application of Reversible Regeneration to Case-Hardening Furnaces Makes Gas a Satisfactory and Economical Fuel

By A. J. SMITH
Warwickshire, England

MOST of the advocates of artificial heating for case-hardening (or carburizing) have in the past stressed chiefly the advantage of accurate maintenance of temperature over a prolonged period rather than any actual economy in fuel costs measured in dollars; but of late years figures have become available which show that without in any way forfeiting the recognized advantages obtained through gas heating, certain types of furnace take a high ranking considered on the basis of fuel costs alone, provided some adequate system of regeneration is employed, such as is the case when double reversible regenerators are built in the construction of the furnace.

The process of carburizing is designed to give an extremely hard wearing surface to steel parts, while at the same time preserving a toughened core which will withstand shocks, the two requirements being to a great extent mutually opposed. To provide the necessary carbon penetration of the surface, which is required high in carbon for surface hardness, parts of low-carbon stock are placed in boxes, packed with suitable carburizing material such as leather, charged into a furnace, and heated to a temperature in the neighborhood of 900 deg. C. for a length of time which depends upon the depth of penetration required. This operation is usually followed by a couple of reheatings.

It is seldom that the initial carburizing process occupies less than six hours, and it may often be prolonged for more than twelve so that from the viewpoint of fuel consumption the process is an important one, and a temperature of great accuracy during that time is essential for good results. Compared with many other processes, very little data have been available on the actual consumption of fuel for carburizing a given weight of output, and many of the figures available on the subject are difficult to classify properly through the different depths of case used. One user may require a depth of case which is obtainable in six hours, while another will require perhaps a 2½ mm. or 3 mm. penetration which necessitates a furnace run of some 14 hours; so a fuel consumption figure is meaningless unless the length of the furnace run is stated.

One firm of furnace builders in Europe have for some years been experimenting along the lines of reversible regeneration applied to all their gas furnaces, especially those for case-hardening. These furnaces operate upon gas at ordinary pressure under a slight air blast of a few inches pressure provided by an open-type fan. One recorded run of a battery of seven furnaces of this type (each 78 in. x 27 in. x 18 in.) for carburizing in the works of a firm producing large quantities of textile machinery showed an overall gas consumption of 4.7 cu.ft. of gas per lb. of charge heated, this figure being reckoned on the total weight passed through the furnace (parts, boxes, and compound) of 87 cwt. Each furnace had a hearth surface of 14.6 sq.ft., and a load of 90 lbs. per sq.ft. of hearth; four of the furnaces were in operation 14 hours, and three for 12 hours.

When reckoning the actual fuel cost of this process, it must be always remembered that the parts which are hardened are but a fraction of the total weight of charge which the furnace has to take care of; but in the instance just recorded an

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analysis of the cost of gas charged against the actual net weight of the parts hardened (instead of the total weight of charge heated) shows this amounts to 0.48 cent per lb., on which basis the users of the installation reckon their weekly saving in fuel and kindred charges over their eight coal furnaces previously used to be about $3,400 per year.

One of the further advantages of gas is that the user can, in a properly designed installation, keep the fuel consumption under the most exact observation in a way which is hardly possible with other systems. The difficulty of securing a reliable record of fuel used from the ordinary type of furnaceman operating solid-fuel furnaces is too obvious to need further comment. The adoption of gas for this process, if combined with an accurate knowledge of the properties of the carburizing reagent used, will enable the machine designer to figure with a considerable degree of accuracy the extra cost which is involved in every millimeter extra depth of case given to any working part.

For this purpose, the following figures showing the hourly gas consumption per lb. of furnace charge on a carburizing heat will be useful:

Gas per lb. to raise furnace and charge from cold to 900 deg. C. in 70 minutes	1.29 cu.ft.
Gas to maintain above temperature, 1st hour	.38 cu.ft.
Gas to maintain above temperature, 2nd hour	.42 cu.ft.
Gas to maintain above temperature, 3rd hour	.38 cu.ft.
Gas to maintain above temperature, 4th hour	.42 cu.ft.
Gas to maintain above temperature, 5th hour	.49 cu.ft.
Gas to maintain above temperature, 6th hour	.49 cu.ft.
Gas to maintain above temperature, 7th hour	.45 cu.ft.
Gas to maintain above temperature, 8th hour	.45 cu.ft.
Total gas per lb. to raise furnace and charge from cold, and maintain at 900 deg. C. for 8 hours	4.77 cu.ft.

These figures are the record of an isolated run of a smaller furnace with the reversible system of regeneration, 54 in. x 32 in. x 16 in., the hearth surface of 12 sq.ft. being only partially loaded with a charge of 713 lbs., or 59 lbs. per sq.ft. of hearth, so the overall figures are naturally not so favorable as those first mentioned; but they are interesting and show the effect which every additional hour of the carburizing period has upon fuel costs. Although overall results may not be quite so striking, the figure is one which it would not be difficult to improve upon under regular productive conditions, and is, therefore, fairly safe for rough calculations.

The subsequent refining heats are usually carried out at temperatures approximating 850 deg. C. for the first, and about 750 deg. for the second, which varies both with the composition of the stock and the properties required of the finished parts. The principal essentials for this work are accuracy of temperature combined with a non-oxidizing atmosphere in the furnace chamber. Although in special cases the reheating process may be prolonged for several hours, this work is in any case much lighter upon fuel than the initial carburizing heat. A Scotch concern manufacturing trucks, who have for many years employed gas for this process with many different types of furnace, finds that the overall consumption of gas for these refining heats works out at 2.5 cu.ft. of gas per lb. of charge, or 5,600 cu.ft. per ton, which at the district rate for gas gives a fuel cost of $2.69 per ton. This figure is obtained in furnaces 48 in. x 18 in. x 12 in. of the reversible regenerative type, but in the more usual form of gas furnace employing a system of regeneration which consists of passing a certain portion of the secondary air through the heated brickwork of the oven, the fuel consumption was much higher, being 6.5 cu.ft. per lb., 15,700 cu.ft. per ton, equal to $7.12 at the rate for gas ruling in the locality.

Whatever may have been the advances made in the actual process of case-hardening during late years, there is undoubtedly room for much investigation into the efficiencies and operating costs of the various types of furnace plant used for such work as well as the life of boxes, and the consumption of carburizing compounds. Lack of data along these lines is the probable cause of the great diversity of practice which is met with.

BOOK REVIEWS

The Lamplighter

By CHARLES DICKENS

D. Appleton & Company, Publishers

DIGNIFIED or otherwise, each of our utility services has its traditional progenitor, and the gas industry has the simple figure of the lamplighter going his rounds.

It is not generally known that Charles Dickens once wrote a play, and afterwards a story, based on the quasi-ancient profession of lamp lighting, called by no more original title than "The Lamplighter."

This slender volume will be a joy to any and every gas man fortunate enough to get a copy. It is a fantastic story which mingles astrology with gas, and yet it contains many allusions which clearly reflect the popular mind when gas itself was almost regarded as one of the black arts.

Dickens says, concerning lamplighters, "that they rigidly adhere to old ceremonies and customs which have been handed down among them from father to son since the first public lamp was lighted out of doors; that they intermarry, and betroth their children in infancy; that they enter into no plots or conspiracies (for who ever heard of a traitorous lamplighter?); that they commit no crimes against the laws of their country (there being no instance of a murderous or burglarious lamplighter); that they are, in short, notwithstanding their apparently volatile and restless character, a highly moral and reflective people; having among themselves as many traditional observances as the Jews, and being, as a body, if not as old as the hills, at least as old as the streets. It is an article of their creed that the first faint glimmering of true civilization shone in the first street-light maintained at the public expense. They trace their existence and high position in the public esteem, in a direct line to the heathen mythology; and hold that the history of Prometheus himself is but a pleasant fable, whereof the true hero is a lamplighter."

You can imagine that a new and somewhat changed generation of lamplighters grew up with the discovery of gas. Hear Mr. Dickens again:

"His (that's Tom's uncle's) fate was a melancholy one. Gas was the death of him. When it was first talked of, he laughed. He wasn't angry; he laughed at the credulity of human nature. 'They might as well talk,' he says, 'of laying on an everlasting succession of glow-worms'; and then he laughed again, partly at his joke, and partly at poor humanity.

"In course of time, however, the thing got ground, the experiment was made and they lighted up Pall Mall. Tom's uncle went to see it. I've heard that he fell off his ladder fourteen times that night, from weakness, and that he would certainly have gone on falling till he killed himself, if his last tumble hadn't been into a wheelbarrow which was going his way, and humanely took him home. 'I forsee in this,' says Tom's uncle faintly, and taking to his bed as he spoke—'I forsee in this,' he says, 'the breaking up of our profession. There's no more going the rounds to trim by daylight, no more dribbling down the oil on the hats and bonnets of ladies snd gentlemen when one feels in spirits. Any low fellow can light a gas-lamp. And it's all up.'"

Which of the gas company employees' dramatic societies will be the first to present this, a one act farce, on the stage for the benefit of friends and customers?

Public Service Review—1926

THIS, a seventy-two page book in two colors, which explains by text and by pictures some of the many uses of the utility services furnished by the subsidiary companies of Public Service Corporation of New Jersey, is being sent to the corporation's stockholders.

This is the fourth in the series of *Reviews*. The first, in 1923, outlined the historical development of the company, the book for 1924 told of the physical properties necessary to furnish gas, electric and transit service to most of the people of New Jersey and the book for 1925 was a record of construction and extension projects undertaken by Public Service.

The present volume tells of the manifold applications of electrical energy, the increasing use of gas as an industrial fuel and the basic service performed by local transportation in community development.

The book also presents the consolidated balance sheet of the corporation and its subsidiary companies and other statistical tables showing the operations of Public Service companies.

OUR NEW MEMBERS

GAS COMPANY MEMBERS

Indiana-Ohio Public Service Co., Winchester, Ind.

MANUFACTURER COMPANY MEMBERS

American Brown Boveri Electric Corp., Camden, N. J.

Reading Iron Co., Reading, Pa.

Comet Radiator Co., Philadelphia, Pa.

Cahill Co., Chattanooga, Tenn.

J. B. W. Gardiner, Inc., New York, N. Y.
Carbide & Carbon Chemicals Corp., New York, N. Y.

ACTIVE MEMBERS

Rodgers, Mary E., Brooklyn Borough Gas Co., Coney Island, N. Y.
Cook, George W., Manchester Gas Co., Manchester, N. H.
White, Wm. A., Boone County Coal Co., Chicago, Ill.
Bow, Harry G., Superior Sheet Steel Co., Canton, O.
Ferguson, Hugh E., The Peoples Gas Light & Coke Co., Chicago, Ill.
Cooper, Howell C., Hope Natural Gas Co., Pittsburgh, Pa.
Hirt, E. L., Canadian & General Finance Co., Ltd., Toronto, Ont., Canada.
Sperry, Marcy L., Fall River Gas Works Co., Boston, Mass.
Lynch, Jarvis D., Peoples Gas Co., Glassboro, N. J.
Brown, Ralph L., International Combustion Engineering Co., New York, N. Y.
Cabot, Philip, Harvard Business School, Cambridge, Mass.
Corrin, John B., Hope Natural Gas Co., Pittsburgh, Pa.
Jabine, Thomas, Merco Nordstrom Valve Co., New York, N. Y.
Wethrell, Helen, Laclede Gas Light Co., St. Louis, Mo.
Burr, Robert B., The Logan Gas Co., Columbus, O.
Egan, E. J., Manufacturers Light & Heat Co., Pittsburgh, Pa.
Gleason, Charles W., United Natural Gas Co., Oil City, Pa.
Kerr, Thomas H., Ohio Fuel Gas Co., Columbus, O.
Keyes, George C., Northern Union Gas Co., New York, N. Y.
Thompson, Wm. M., Reliance Regulator Co., Pasadena, Calif.
Caldwell, John R., 3907 Ventnor Ave., Atlantic City, N. J.
Brown, Albert J., Concord Gas Co., Concord, N. H.
Palmatier, Arlyn H., Rockland Light & Power Co., Middletown, N. Y.
Loeffler, Charles F., Quick Meal Stove Co. Div., St. Louis, Mo.
Card, Lawrence B., Henry L. Doherty & Co., New York, N. Y.
Rissland, Louis W., Public Service Electric & Gas Co., Newark, N. J.
Clarke, Fred H., Public Service Electric & Gas Co., Newark, N. J.
Georgeson, Gilbert J., Public Service Electric & Gas Co., Newark, N. J.
Jackson, H. W., Jas. Graham Mfg. Co., San Francisco, Calif.
Steinhauer, W. A., Toledo Edison Co., Defiance, O.
Kavanaugh, Frank, Public Service Electric & Gas Co., Newark, N. J.
Hayward, H. W., Combustion Utilities Corp., New York, N. Y.
Day, Lloyd E., Consolidated Gas Co. of N. Y., New York, N. Y.
Sasser, David F., Consolidated Gas Co. of N. Y., New York, N. Y.
Winder, Frank J., Surface Combustion Co., Pittsburgh, Pa.
Clark, Willard L., Public Service Electric & Gas Co., Newark, N. J.
Jebb, William T., Manchester Gas Co., Manchester, N. H.
Vogel, Armin C., Consolidated Gas Co. of N. Y., New York, N. Y.
Graser, Ferdinand H., United Utilities & Service Corp., Philadelphia, Pa.
Gorden, David, Consolidated Gas Co. of N. Y., New York, N. Y.
Blesch, Charles A., Surface Combustion Co., Pittsburgh, Pa.
Schweikert, John N., Bryant Heater & Manufacturing Co., Cleveland, O.
Smith, Chas. S., Quick Meal Stove Co. Div., St. Louis, Mo.
Storbeck, Fred, Jr., Public Service Electric & Gas Co., Paterson, N. J.
Conklin, Wm. E., Central Hudson Gas & Electric Co., Newburgh, N. Y.
Redfield, P. M., Counties Gas & Electric Co., Philadelphia, Pa.
Cagney, J. J., General Engineering & Management Corp., New York, N. Y.
Dean, Frank G., Barstow Stove Co., Providence, R. I.
Purcell, James R., City Gas Works, Richmond, Va.
Reynolds, M. B., Reynolds Gas Regulator Co., Anderson, Ind.

First Degree in Gas Engineering Awarded

DONALD T. BONNEY, of Pittsburgh, Pennsylvania, received the degree of Bachelor of Engineering in Gas Engineering in the class of 1926 at the Johns Hopkins University.

Dr. W. J. Huff, Professor of Gas Engineering at Johns Hopkins, advises that as far as he knows, Mr. Bonney is the first person in the United States to have received this honor.

Mr. Bonney was born March 21, 1904, in Union City, Erie County, Pennsylvania. He received his early education in the grade and high schools of Edgewood (near Pittsburgh), Pennsylvania. Later he attended the Baltimore Polytechnic Institute, graduating in 1923. In the fall of 1923 he entered the school of Engineering at The Johns Hopkins University, enrolling in Mechanical Engineering. He transferred to the Department of Gas Engineering in 1924 when that department was established and in June, 1926, received the degree of Bachelor of Engineering in Gas Engineering. In October, 1926, he was appointed Research Assistant of Gas Engineering.

Lucius Bigelow Dies at Buffalo, N. Y.

LUCIUS SEYMOUR BIGELOW, President and Editor of the *Gas Industry* Magazine, died on October thirty-first, at Buffalo, N. Y.

Mr. Bigelow was born at Homer, N. Y., September 6th, 1859. He together with his three brothers founded a printing office in Buffalo. Mr. Bigelow enlarged the field of his activities by becoming connected with a large type foundry, as manager for N. W. Ayer & Sons, a Philadelphia advertising Agency, later becoming manager of the *Engineering & Mining Journal.*

He purchased the magazine *Light* in 1903. The name of the magazine was later changed to *The Gas Industry,* by which name it is known today. A few years later Mr. Bigelow purchased *The Natural Gas Industry,* then known by another title. Both of these publications are today flourishing and important supporters of their respective fields. Mr. Bigelow later established a third publication, known as *Household Appliances,* Bigelow's Sales Extension Service.

When Mr. Bigelow entered the publishing field in the interests of gas utilization, the gas heating business was young and Mr. Bigelow recognized its infinite possibilities for development. To increase the use of gas, more gas appliances must be sold, and better gas appliances must be manufactured. A nation-wide co-operation only could bring this about. In 1905 through the columns of his magazine, Mr. Bigelow sent out the call for supporters to his plan to create a national commercial gas association, which through its efforts should set in motion forces through which the gas appliance manufacturing industry should receive recognition at the hands of gas companies as supplying the means through which gas sales should be increased. Twelve men of the industry answered Mr. Bigelow's call, and joined him in his movement to create what came to be known as the National Commercial Gas Association. The first meeting of these original 13 members took place on May 12th, 1905. Mr. Bigelow wrote the prospectus for the organization, gave it its name, gave it unlimited support through his editorial columns, and served as its secretary during the years 1905, 1906, 1907, 1908 and 1909. The National Commercial Gas Association was a magnificent success, and it played an important part in the development of the commercial end of the business.

Eight years ago the National Commercial Gas Association was merged with the American Gas Institute, the consolidated organization being known as the American Gas Association.

Mr. Bigelow was a Member of the American Gas Association and also an Honorary Member of the New Jersey Gas Association. He was a member of many of the state gas associations, and was a well-known and popular figure at their gatherings.

Mr. Bigelow is survived by his wife, Mrs. Sarah Harris Bigelow, two daughters and three sons; Mrs. Storrs S. Waterman of Tacoma, Wash.; Mrs. Karl E. Wilhelm of Buffalo; Harris Storrs Bigelow, Vice-President of the Periodicals Publishing Company; Allen Caryl Bigelow, Secretary of the company; and Lucius Seymour Bigelow, Jr.

THE TIDE OF MEN AND AFFAIRS

GEORGE E. WHITWELL, formerly in charge of commercial development work in the gas department of Byllesby Engineering and Management Corporation, was appointed recently general manager of the Equitable Gas Company of Pittsburgh, furnishing gas to that city, upon the promotion of E. D. Leland to assistant to the vice-president of the company.

R. V. HOWES, assistant superintendent, commercial department, the Consolidated Gas Company of New York, N. Y., was recently elected president of the Allied Heating and Ventilating Exhibitor's Association.

C. N. CHUBB, who has been general manager of the United Light and Power Engineering and Construction Company, Davenport, Ia., is now vice-president of the company.

S. C. SCHMULBACH, sales manager, Illinois Power & Light Corp., East St. Louis, Mo., has been made district manager for the same company at Cairo, Ill.

D. A. POWELL, who has been connected with the Milwaukee Gas Light Co., Milwaukee, Wisc., is now with the Muskegon Traction and Lighting Company, Muskegon, Mich.

L. C. HARVEY, industrial gas engineer, Illinois Power & Light Corp., is now connected with the Bryant Heater and Manufacturing Company, Cleveland, Ohio.

THE CONNECTICUT GAS ASSOCIATION at their annual meeting recently at the Graduate's Club in New Haven elected George S. Hawley, vice-president of the Bridgeport Gas Light Co., president. Mr. Hawley succeeds W. H. Nettleton, former president of the New Haven Gas Light Co., who died about a year ago and who for a number of years was president of the state association. The vice-president elected is Andrew J. Sloper, president of the New Britain Gas Light Co. Charles A. Leonard, general manager of the Meriden Gas Light Co., was elected treasurer. E. E. Eysenback, who is the vice-president and general manager of the Hartford Gas Light Co., was chosen secretary. The assistant-secretary is J. A. Norcross, vice-president and general-manager of the New Haven Gas Light Co.

COMPANY CHANGES

WAITE & DAVEY, Inc., 5 Court Square, Long Island City, N. Y., is now known as the American Arch Company, at 17 East 42 St., New York, N. Y.

THE KEENE GAS & ELECTRIC CO., Keene, N. H., Manchester Traction Light & Power Co., Nashua, N. H., and Laconia Gas & Electric Co., Laconia, N. H., are now known as the Public Service Co. of New Hampshire.

Building a Rate

(Continued from page 720)

commodity charge gets close to the bare production cost of gas.

In conclusion let me urge the introduction of more rates based not only on cost analysis but also upon what the traffic can most easily bear, rates which provide foundations ample enough to carry their walls and as much of the roof of net earnings as the subsoil of competition will permit. At the same time, we should not neglect our present structure lest the main supporting foundations be undermined and lost. It is not the big customer that requires the most attention, for he is in a position to demand and get all he needs. It is the customer using from two to ten thousand cubic feet of gas each month that is entitled to prompt relief and the only way we can give it to him is by means of a real readiness-to-serve charge.

Brooklyn Learns About Gas

(Continued from page 727)

petent dieticians in charge of the work and then cooked and served to the waiting throngs. The Brooklyn Union Gas Company was represented in this work by the Misses Soule and Grant, while Miss Emmons did the honors for The Kings County Lighting Company and Miss Pidgeon for The Brooklyn Borough Gas Company.

The general decorations of the booths were very pleasing especially the rest room and office which followed the lines of a Grecian Pergola converted to modern uses.

The special posters that were painted for the show were very attractive. They illustrated some special phase of the gas industry and service, such as metal melting, industrial bread baking, metal forging, gas making and the advantages of gas-fired central house heating boilers.

The three associated gas companies exhibited the spirit of their service at this exposition, and installed a display of which all of Brooklyn is justly proud.

Affiliated Association Activities

Pennsylvania Gas Association

THE Mid-Year Meeting will be held at Norristown, Pa., on December 6, 1926, at 10 A.M. The program will be opened with an address by the President, A. C. Taylor. Papers will be read on "Budgetary Control" and "Operating, Equipping and Maintaining Automobiles," and the various committees of the Association will present reports. The usual luncheon will be held at 1 P.M. to be addressed by speakers of prominence on timely subjects. The afternoon session will be entirely taken up by round table discussions including service to customers from the time request is received to turn on gas to the installation and use of the appliances. Everyone who has attended the mid-winter meetings of the Pennsylvania Gas Association knows their value and Secretary G. L. Cullen promises that this meeting will be up to the usual standard if not better.

Oklahoma Utilities Association

A COMMITTEE of twenty, representing all branches of the industry and all sections of the state is actively engaged under the direction of Manager E. F. McKay, on the arrangements for the general convention of this Association to be held at the Huckins Hotel, Oklahoma City, Oklahoma, March 8, 9 and 10, 1927. Although these arrangements are in the early preliminary stages, interest is keener than ever before this far ahead and another "best convention ever" is anticipated. Tentative acceptances for the program from several speakers of national prominence have already been received. The central idea of the conventions of the Oklahoma Utilities Association always is to bring to the rank and file of the several branches of the public utility industry of Oklahoma as much as possible of what those present would get if they could attend the national conventions. The program for the 1927 convention will follow this idea.

Gas Sales Division—New England Gas Association

THE Speaker for the December 10 meeting to be held as usual at the Boston City Club, Boston, Massachusetts at 6:00 P.M., will be Eugene M. Weeks, Merchandising Director of the Atlantic Printing Company, Boston, who will speak on "Organized Sales Plans."

This Division of the New England Gas Association meets on the Friday before the second Saturday of November, December, January, March, April and May. The Governor of the Division, M. Bernard Webber is planning an exceptionally promising program for this season's meetings.

Eastern States Gas Conference

IT has been found expedient to change the dates for the Eastern States Gas Conference to April 7 and 8, 1927. The meetings will be held in the Bellevue-Stratford Hotel, Philadelphia, Pennsylvania.

New England Gas Association

THE Directors of the New England Gas Association have selected February 23 and 24, 1927, as the dates for the Annual Meeting of the Association. It will be the first meeting of this Association formed last February by the consolidation of the New England Association of Gas Engineers, Gas Sales Association of New England and the Industrial Gas Association.

The meeting will be held at the Hotel Bancroft in Worcester, Massachusetts and members are requested to make their hotel reservations directly with the hotel.

Pacific Coast Gas Association

THE first quarterly conference of the Pacific Coast Gas Association for the year 1926-1927 was held in San Francisco on November 18. Parallel meetings of the Technical, Accounting and Public Relations Sections were held in the morning, and a Commercial Section meeting in the afternoon. A noon luncheon replaced the usual evening dinner in order to permit a number of those attending the conference to make an overnight trip to Marysville to inspect the newly completed water gas plant of the Pacific Gas and Electric Company.

The conference was especially important as the Association is this year trying out a new plan of building up its committee organization. The chairmen of the four major sections were appointed by President Yard at the convention in August and instructed to prepare a program for the year, naming problems to be studied and describing the desired angle of attack. This program, which called for some 60 committees, was mailed to the Association membership accompanied by a request for those interested to volunteer to serve. The response was very gratifying. The complete committee organization was determined upon at the conference and the subjects assigned were thoroughly discussed. It is believed that this procedure will tend to confine the com-

mittee work of the Association to live and useful topics and greatly raise the standard of reports and papers.

Frank W. Steere, of the Steere Engineering Company, was in attendance at the Technical Section conference and took part in the discussion of the Marysville plant which is the first water gas plant to be operated in California for many years. At the Commercial conference, H. M. Crawford, sales manager of the Pacific Gas & Electric Company, suggested ways in which the Pacific Coast could best co-operate with the Blue Star plan of the American Gas Association.

Section chairmen are E. N. Simmons, Los Angeles Gas and Electric Corporation, Accounting Section; C. M. Grow, Southern California Gas Company, Commercial Section; D. L. Scott, Los Angeles Gas and Electric Corporation, Public Relations Section; and R. M. McCalley, Portland Gas and Coke Company, Technical Section.

Pennsylvania Gas Association

PRESIDENT A. C. Taylor announces that the next annual meeting of his Association will be an all day affair on the day preceding the Eeastern States Gas Conference, that is on April 6, 1927 at the Bellevue-Stratford Hotel, Philadelphia, Pennsylvania.

Secretaries Meeting

THE informal organization of secretaries of utilities associations will hold its annual conference at the Hotel Roosevelt, New Orleans, La., December 9 and 10, 1926. The sessions are long and earnest discussions of the many phases of association work take place. It is hoped all of the secretaries of the sixteen associations affiliated with the American Gas Association will be present as attendance will undoubtedly benefit their Associations. The President of the Secretaries Association is E. N. Willis, Secretary of the Southwestern Public Service Association.

Exhausting Burned Products

(Continued from page 734)

be readily accessible, so that the work can be properly done.

MINIMUM AREAS REQUIRED FOR VENTS AND VENT CONNECTIONS

In an article of the June, 1926, AMERICAN GAS ASSOCIATION MONTHLY on "Determination of Permissible Flue Areas for Gas Practice" a definite procedure is outlined for specifying necessary flue areas. To make this material more readily usable to the practical man a portion of the information has been transcribed in tabular form, as shown in the following table for an average height of vent.

EXHAUSTING BURNED PRODUCTS FROM GAS APPLIANCES

Maximum Heat Energy Generated in B.T.U. Hourly	*Minimum Diameter in inches of Round Vent Necessary*	*Minimum Area in Square Inches on Rectangular Vent or Vent Connection, Whose Ratio of Long Side to Short Side Does not Exceed the Following:*						
		1 to 1	1½ to 1	2 to 1	3 to 1	4 to 1	5 to 1	6 to 1
40,000	3	9.0	9.4	10.0	12.0	14.0	16.2	18.4
62,700	3½	12.3	12.8	13.8	16.3	19.1	22.1	25.1
85,500	4	16.0	16.6	18.0	21.4	25.0	28.8	32.7
120,000	4½	20.3	21.1	22.8	27.0	32.0	36.5	41.5
151,000	5	5.0	26.0	28.2	33.4	39.1	45.0	51.0
194,000	5½	30.3	31.5	34.0	40.3	47.3	54.5	61.8
242,400	6	36.0	37.4	40.5	48.0	56.4	64.8	73.5
300,000	6½	42.3	44.0	47.5	56.3	66.0	76.0	86.5
370,000	7	49.0	51.0	55.0	65.4	76.6	88.3	100.0
422,000	7½	56.3	58.5	63.3	75.0	87.8	101.2	114.3
490,000	8	64.0	66.6	72.0	85.3	100.0	115.2	130.6
600,000	8½	72.3	75.3	81.3	96.2	113.0	130.0	147.6
685,000	9	81.0	84.3	91.0	108.0	126.6	145.7	165.5
793,000	9½	90.3	94.0	101.5	120.5	141.1	162.4	184.5
892,000	10	100.0	104.0	112.5	133.3	156.3	180.0	204.3
997,000	10½	110.3	114.5	124.0	147.0	172.2	198.4	225.0
1,118,000	11	121.0	126.0	136.0	161.5	189.0	218.0	247.0
1,255,000	11½	132.0	137.5	148.5	176.0	206.0	238.0	269.0
1,400,000	12	144.0	150.0	162.0	192.0	225.0	259.0	294.0
1,718,000	13	169.0	176.0	190.0	225.0	264.0	304.0	345.0
2,076,000	14	196.0	204.0	221.0	261.0	306.0	353.0	400.0
2,474,000	15	225.0	234.0	253.0	300.0	351.0	405.0	459.0

Notes: When air inlets must be provided in a gas appliance vent, additional area is required in amount equal to the summation of intake throats.

In order to prevent flue stoppages and other troubles, no vent smaller than the equivalent of 4" round and no vent connection smaller than the equivalent of 3" round should ever be installed.

Is Utility Management a Profession?

By PHILIP H. GADSDEN
Vice-President in Charge of Public Relations, The United Gas Improvement Co., Philadelphia, Pa.

WHILE every one marvels at the great advance made by public utilities during the last twenty-five years in the processes of production and distribution—in manufacturing and selling—comparatively few realize the fundamental changes which have come about during that period in the relations of the utilities to the public—in the field of public relations.

At first public utilities were looked upon as any other business—as private enterprises entitled to whatever profits they could make and to charge the highest rates the business would stand. There was no recognition of the public interest involved.

Their relations with the communities they served were frequently openly hostile or on the basis of armed neutrality. Negotiations between the utilities and the cities in which they operated were conducted on the basis of a horse trade, where any advantage gained by one side must necessarily be at the expense of the other. Each side sought to exploit the other.

The free play of competitive forces was looked upon as proper by the communities in granting franchises, as well as by contending groups of financial interests within the industry.

No thought was given by either side to the economic wastes which must result from such destructive competition. Nor was there any realization of the fact that such losses must ultimately in large measure be born by the communities.

The first recognition of the true relationship between these utilities and the communities they served—the first approach to an understanding of the predominating interest of the public and of the true economics involved—was in the establishment of public service commissions by several states about 1907. The creation of these commissions was bitterly opposed by the utilities as depriving them of that complete control over their properties which all other classes of business enjoyed. They were insisted upon by the public as necessary to insure that rates charged should bear a definite and proper relation to the service rendered and the value of the property devoted to the public interest.

COMMISSIONS HAVE JUSTIFIED THEIR EXISTENCE

In the short period which has elapsed they have fully justified their existence and by their impartial treatment of the novel and complex questions involved they now enjoy the confidence and respect of both the utilities and the public. They constitute America's distinctive contribution to this great question. In place of the European system of governmental ownership and operation of these utilities, the genius of America has substituted regulation of rates and service through state commissions, thereby preserving all the advantages of private initiative and resourcefulness while re-

Presented before the recent convention of the Philadelphia Electric Ass'n, Bedford Springs, Pa.

taining that degree of supervision necessary to protect the public in the enjoyment of reasonable rates and adequate service.

Slowly, through the decisions of these commissions, the public and the utilities began to understand that the old basis of antagonism and destructive competition was all wrong, and that instead, their interests were mutual and interdependent, that each was vitally interested in the prosperity of the other.

It is now generally recognized that a community can grow no faster than its public utilities.

This new concept of the mutuality of interest between the public and the utilities has had a profound effect upon both in their consideration of the problems involved. Exploitation was supplanted by co-operation, and for antagonism and for suspicion there is gradually being substituted sympathetic understanding of the economics of the situation.

On the part of the public it is being appreciated that utilities differ from all other kinds of business in requiring a continuous supply of new capital to provide for the incessant demand for increased service, and that to secure this new money a high degree of financial credit is absolutely essential. When, therefore, any question affecting the rates or service of a utility is under consideration, instead as formerly the first and only consideration being how much can rates be reduced or the service expanded, the inquiry is, or should be, what effect will the proposed action have upon the financial credit of the utility. If its ability to finance needed extensions and betterments is curtailed, the public will suffer many times more than the utility.

MUTUALITY OF INTEREST

This new concept of the relationship between the utilities and the public—the mutuality of interest—has had its most marked effect on the mental attitude of the men and women in the industry—the personnel—on the whole subject of their duty and responsibility to the public. It has changed the nature of the business from one of manufacture and sale of a commodity to the rendering of a service which is rapidly becoming essential to the comfort, convenience and prosperity of the nation.

The subject of public relations, which twenty-five years ago was almost unknown and had practically no place in the scheme of utility management, is now recognized as most vital in the operation of any utility. Whether relations with the public are good or bad spells the difference, frequently, between success or failure. We have further learned that securing and retaining the sympathetic understanding and friendly co-operation of the public is not a one man's job. It can not be accomplished by the executives alone, but it requires the loyal and unremitting effort of every man and woman in the industry. It calls for collective effort—for teamwork.

The subject of public relations opens up a new and inspiring field for the activities of the great army of utility employees. It is a task which they are peculiarly fitted to perform. In the eyes of the public they are the utility.

The opinion held by the public of most utilities is based upon the efficiency and courtesy of the individual employee or the lack of such qualities.

This realization of their partnership in the work—their essential relation to the success of the common enterprise—has in turn dignified their positions in their eyes and made them more desirable. It has greatly increased their sense of responsibility to the public and that sense of responsibility has tended to develop and strengthen their finer qualities, as always happens in such cases.

UTILITY STANDARDS ON HIGHER PLANE

The result is that the standards of conduct—the code of ethics—of the public utility industry is today on a much higher plane. The whole public utility industry in the United States is rapidly approaching that stage in its development, described by Secretary Hoover recently,

(Continued on page 760)

ACCOUNTING SECTION
A. L. TOSSELL, Chairman — EDWARD PORTER, Vice-Chairman
H. W. HARTMAN, Secretary

What One Company Does With Statistics

The Peoples Gas Light and Coke Company Uses All Available Figures to the Utmost Advantage

STATISTICS are valuable—if properly used. No propaganda is necessary to sell the industry on the need of correct and adequate figures as to its condition, its progress and its trends. However, there is need of selling effort to convince the various companies that statistics are valuable, that they can be used in many ways, and that their use is essential.

The Peoples Gas Light and Coke Company of Chicago, Ill., is probably in advance of the other companies as far as statistical progress is concerned. The charts reproduced on this page and those following are testimony to the fact that the company is wide awake to the value of statistics, and, more, knows how to use them to advantage.

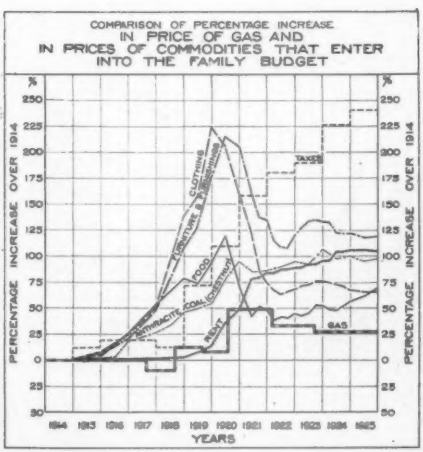
Merely showing how one company has taken advantage of the facts and figures at its disposal, these charts and graphs are of value to other gas companies. When the industry is sold on the value of correct statis-

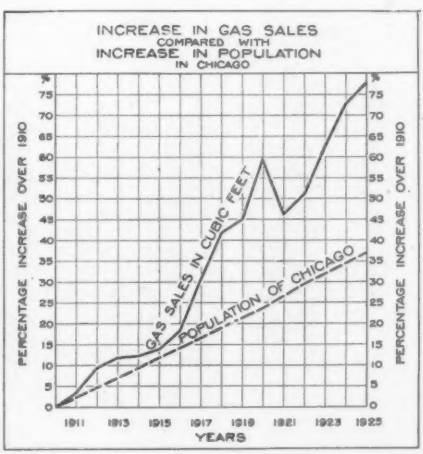
THE 48-INCH MAIN

THE BACKBONE OF CHICAGO'S GAS DISTRIBUTION SYSTEM IS THE GREAT 48-INCH MAIN EXTENDING NEARLY THE ENTIRE LENGTH OF THE CITY ALONG ITS WESTERN FLANK. IT IS 22 MILES LONG AND COST ABOUT $200,000 PER MILE OR A TOTAL OF $4,500,000.

9,500 TWELVE-FOOT SECTIONS OF PIPE, EACH WEIGHING 4 TONS, WERE USED IN THE LAYING.

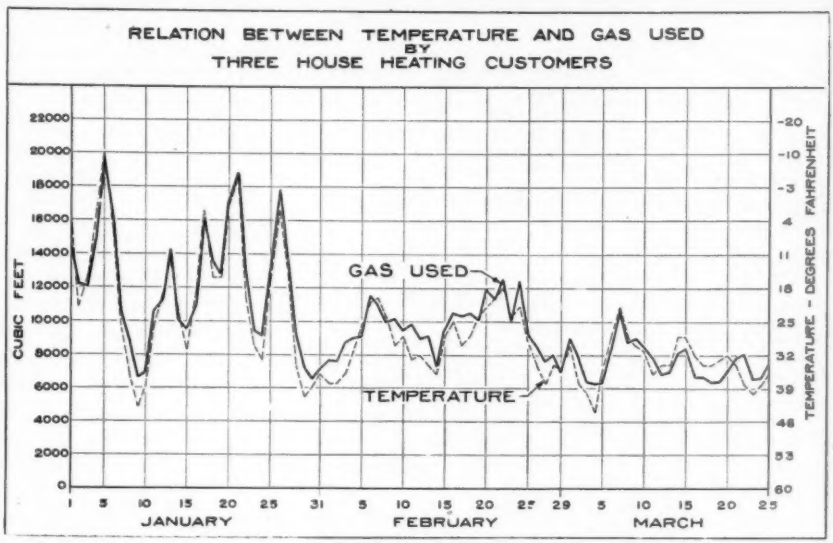
THE CARRYING CAPACITY OF THIS MAIN, AT ORDINARY PRESSURE, IS 100,000,000 CUBIC FEET OF GAS EVERY 24 HOURS, OR MORE THAN THE AVERAGE DAILY GAS REQUIREMENTS OF THE ENTIRE CITY. THIS CAN EASILY BE DOUBLED, WHEN NECESSARY, BY INCREASING THE PRESSURE.



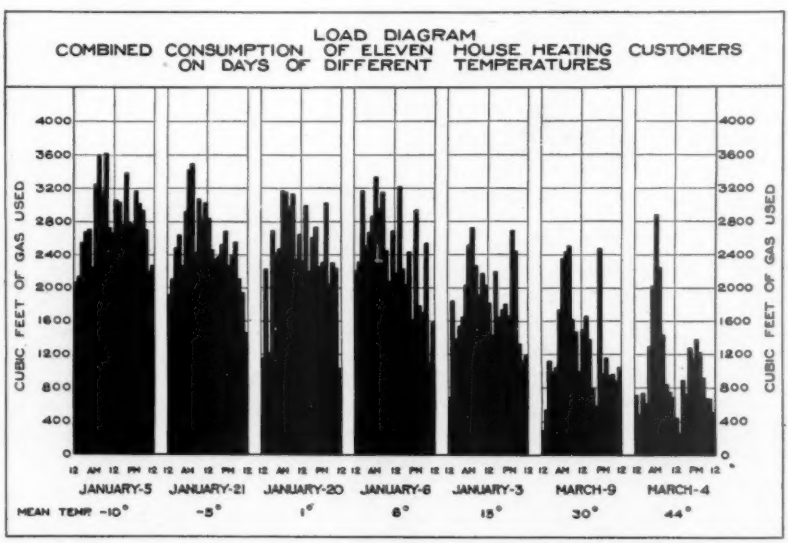


tics as thoroughly as it should be, these charts will be the rule rather than the exception.

If any company has done similiar work, THE MONTHLY would be glad to hear of it.



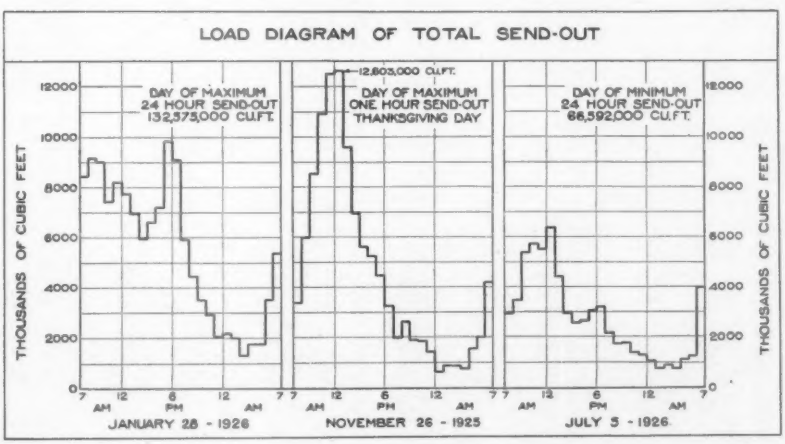
The substitution of graphs and charts for figures is usually successful because the picture of a fact is always more convincing than the mere recital of it in numerical terms. On this page are two examples worthy of attention. The chart above represents a condition that has been expressed in figures many times, but it has never been more vividly shown than by the two lines here that tell the story in a glance. The chart below shows how well rather comprehensive data can be portrayed.



ANALYSIS OF GAS SALES BY CLASS OF BUSINESS
MARCH - 1926

	NUMBER OF CUSTOMERS	PERCENTAGE OF TOTAL	TOTAL CONSUMPTION IN CUBIC FEET	PERCENTAGE OF TOTAL	AVERAGE CONSUMPTION PER CUSTOMER
DOMESTIC					
CUSTOMERS LIVING IN					
SINGLE FAMILY DWELLINGS	128,885	16.52%	476,747,200	15.81%	3,699
TWO AND THREE APARTMENT BUILDINGS	321,729	41.31	726,766,200	24.09	2,259
LARGER THAN FOUR APARTMENT BUILDINGS	257,078	33.01	525,751,600	17.43	2,045
TOTAL	707,693	90.87	1729,265,200	57.33	2,444
MASTER METERS	479	.06	24,946,600	.83	52,081
HOTELS, RESTAURANTS, CLUBS, HOSPITALS, ETC.	9,248	1.18	365,298,000	12.11	39,500
MANUFACTURERS: (INDUSTRIAL)					
AGRICULTURAL	9	—	33,371,000	1.10	3,707,889
AUTOMOTIVE	298	.04	29,868,000	.99	100,228
ELECTRICAL	462	.06	39,144,000	1.30	84,727
FOOD	1,199	.15	98,788,200	3.21	80,724
IRON AND STEEL	1,855	.24	117,877,800	3.89	63,223
NON-FERROUS	92	.01	21,002,400	.69	228,287
PRINTING AND PAPER	1,034	.13	40,763,200	1.35	39,423
TEXTILES	811	.10	15,906,600	.53	19,614
MISCELLANEOUS	894	.12	83,747,400	.78	36,563
TOTAL	6,654	.85	417,888,600	13.85	62,800
RETAIL STORES DEALING IN FOOD PRODUCTS	18,886	2.43	76,447,600	2.53	4,047
GENERAL MERCHANDISE	11,721	1.50	36,035,400	1.20	3,074
TOTAL	30,609	3.93	112,483,000	3.73	3,675
SHOPS - BARBERS, TAILORS, SMALL LAUNDRIES, ETC.	12,021	1.54	53,734,400	1.85	4,636
PUBLIC PLACES - CHURCHES, THEATERS, ETC.	3,449	.44	34,636,200	1.15	10,042
BUSINESS AND PROFESSIONAL OFFICES	3,392	.44	9,509,200	.32	2,803
WHOLESALE HOUSES	1,074	.14	8,857,600	.29	8,247
HOUSE HEATING:					
CENTRAL HEATING PLANTS	921	.12	80,985,000	2.68	87,932
MISCELLANEOUS AUXILIARY APPLIANCES - GASTEAM RADIATORS, GARAGE HEATERS, ETC	3,267	.42	71,182,200	2.36	21,788
TOTAL	4,188	.54	152,167,200	5.04	36,334
STREET LIGHTING SALES	1	—	10,295,000	.34	10,295,000
SALES TO OTHER UTILITIES	2	—	95,43,000	3.16	47,715,500
GRAND TOTAL	778,810	100.00%	3,016,490,000	100.00%	3,873

Say it with graphs and charts and be sure it is said with force! The chart below, of the load diagram of total sendout, brings home the peak load production idea, even to the layman. The figures above, that show the analysis of gas sales by class of business, give in small space a most important set of figures. To put these data in a graph or chart, such as a circle with the relative size of each kind of business represented by a segement, would be the work of a few minutes.



ANALYSIS OF GAS SALES ACCORDING TO QUANTITY USED PER MONTH PER CUSTOMER
MARCH - 1926

BLOCKS OF CONSUMPTION	TOTAL MONTHLY CONSUMPTION IN CUBIC FEET	NUMBER OF CUSTOMERS
0 TO 800	68,641,400	138,878
1,000 TO 2,800	770,285,600	423,633
3,000 TO 4,800	498,309,400	135,878
5,000 TO 9,800	324,123,600	52,579
10,000 TO 19,800	211,114,600	15,576
20,000 TO 48,800	227,335,000	7,335
50,000 TO 99,800	202,204,000	2,885
100,000 TO 199,800	185,401,200	1,368
200,000 TO 499,800	149,850,600	512
500,000 TO 999,800	66,410,000	97
1,000,000 TO 1,999,800	50,253,800	38
2,000,000 TO 4,999,800	58,166,400	19
OVER 5,000,000	83,264,400	9
TOTAL	2,910,764,000*	778,807

*STREET LIGHTING AND SALES TO OTHER UTILITIES ARE NOT INCLUDED.

LABORING CLASS NOT SMALL USERS OF GAS

In many cities small users of gas are served at a loss under existing rates and this loss must be made up by the larger users. Many of those who have to do with the regulation of rates for gas companies believe that by insisting on a low minimum charge and a low initial step in the rate a great service is rendered to the laboring class in the community. The following illustrations show this theory to be false. It will be seen that the people who live in poorer quarters use a much greater quantity of gas than those who live in high-class apartments.

Number of Customers, 42. Average Monthly Use of Gas Per Customer in Cubic Feet, 937

Number of Customers, 67. Average Monthly Use of Gas Per Customer in Cubic Feet, 658

Number of Customers, 12. Average Monthly Use of Gas Per Customer in Cubic Feet, 3472

Number of Customers, 22. Average Monthly Use of Gas Per Customer in Cubic Feet 4153

PUBLICITY AND ADVERTISING SECTION
HARLOW C. CLARK, Chairman — E. FRANK GARDINER, Vice-Chairman
CHARLES W. PERSON, Secretary

A Primer for the Advertising Manager

A 1926 Edition of the Fundamentals That Are Too Often Forgotten Because They Are Elementary

By LABERT ST. CLAIR
Advertising Director, American Electric Railway Association

EDITOR'S NOTE

TOO often advertising managers forget the fundamentals of advertising. Busy with the complex problems of their department, they lose their vivid impressions of those principles that were as axioms to them in their apprentice days.

This summary is essentially primary: It does not pretend to cover the more advanced and comprehensive advertising problems. For that reason it is of value. While it is written essentially for the street railway advertising men, and from their point of view, the salient points apply equally well to our utility.

This article is the introduction to a portfolio of street railway advertising that the American Electric Railways Association has just published.

THERE is no fixed rule for dividing an electric railway's advertising appropriation. Generally speaking, if the appropriation is small it should be confined largely to the use of the company's own media. This will bring the best results at the lowest costs. Newspaper advertising should come second in expenditures. The other media, billboards, motion pictures, blotters, calendars, etc., should come last. Programs and special editions never should be used.

The most important thing to do in advance of starting an advertising campaign is to decide on a definite plan of action. This is a job requiring the attention particularly of executives and the man who is to write the advertising. Too often a writer is employed and told to "explain the situation to the public" and then is dropped by the executives.

Any campaign which starts from such a premise is sure to fail sooner or later. No executive should employ an advertising man unless he intends to give him the same access to his office and his time as he would any of his vice-presidents. No advertising man should agree to work for an electric railway company unless he is assured of such hearty co-operation. Very few advertising men understand the utility business. They have not been trained in it. No matter how long they stay in the business, the time will never come when they won't need the consul and advice of trained utility executives in the preparation of copy.

Electric railways should follow more closely the methods of merchants in the preparation of their advertising. A merchant devotes little of his space strictly to good will text. John Wanamaker used about the right amount. It was approximately four inches on one column in one corner of his full page advertisements. Entirely too many electric railway companies devote 90 per cent of their space to so-called "good-will" advertising.

The most profitable advertising that an electric railway company can do suggests an expenditure for a definite thing. The great need is a closer study of sales possibilities. Merchants see almost few such possibilities in their stocks as electric railway managers do on their lines, but they know that if they do not continue to discover new sales talk they are going to be sunk. Hence, they struggle persistently to find new arguments for attracting people

to their stores. Surely, if a merchant between four walls can find daily news of interest about his store, electric railway companies, operating throughout communities and dealing with the most interesting thing on earth—rides for folks —ought to be able to keep pace with commercial houses in awakening interest in their business.

One of the best methods for increasing business is to interest employees in aiding with the advertising and merchandising problems. Various progressive companies have increased their business and improved their public relations by the simple expedient of encouraging employees to make sales and good will suggestions. There is no better way to obtain these suggestions than to arouse the interest of employees by offering financial rewards for usable ideas. One intercity company during the last year has increased the volume of its business tremendously by dividing its employees into teams and having them compete for prizes to be awarded the teams bringing in the most business producing suggestions. The cost of this campaign was infinitesimal compared with the profit gained. Incidentally, almost every suggestion produced an idea for an advertisement.

There should be a direct connection between all advertising campaigns and employees. The men should be told in advance what the campaigns are going to be and arrangements should be made to use bulletin boards for letters to employees to see that they are acquainted with the messages that the companies are trying to get to the public.

There is not a company anywhere that cannot afford to utilize its own advertising channels. The cost of printing window signs and leaflets is very small indeed compared with the good results they bring. Window signs are always read. They cannot be avoided.

Window signs and other posters used on cars should be simple in design and contain a minimum of text. Signs to be read from the outside of the cars should not contain over four or five words at the most and should be easily readable at a distance of 50 feet. Inside signs should be limited to tweny to forty words. White cardboard, with the message printed in black or red ink, or both makes the most effective and economical sign. Some companies find it advisable to change the colors of their cards frequently so that the reader may realize that there is a new sign being shown. This should not be necessary. The text should be of sufficient interest to attract the eye. Playing with colors, such as green and blue backgrounds, is always dangerous. Frequently the use of colors results in minimizing the effect of the message.

Companies with liberal appropriations are making good use of poster effects. These posters are expensive, frequently being printed or lithographed in from four to seven colors, but they are very attractive, produce business and are goodwill makers. However, in going into artistic posters make sure that real artistic effects are to be produced. Unless a company can afford high grade art work in poster effects, it had better stick to the simpler printed design.

Editing a leaflet for general distribution is no job for an office boy or anyone not keenly interested in the work. A leaflet must have "pep." If there is any doubt on a company's part of its ability to keep a leaflet up to the minute, the best thing to do is not to publish one. Items should be short, easily read and easily understood. A few jokes or light verses interspersed between the more serious items are helpful. Contributions from outsiders should be encouraged.

Good use can be made of signs wherever construction work is going on. Several general signs should be on hand at all times for use at different points along the line. These signs, painted in letters easily read at a distance, need not necessarily convey information about the particular job that is being done. The more general they are, the more frequently they can be used. General signs can be

used even when men are only reparing a little paving. Such gangs of men always attract attention. Capitalize this by having a sign with a constructive message on it near where your men are at work. Specific signs telling the actual cost of a big construction job always should be used where new track is being laid or other big expenditures are in progress.

The value of blotters, buttons, calendars and similar media depends entirely on the energy shown in introducing them. Merely to pass out any of these items to children indiscriminately is almost a waste of money. But to give one of them to a child with a definite message, particularly a safety message, is constructive advertising. Dumping such things wholesale into schools is likely to prove a great waste of money and frequently it will offend the school authorities. Never attempt to distribute anything to children in schools without first obtaining the cordial consent of those in charge.

Policy sometimes compels companies to buy space at charity bazaars and similar places. When such space is taken an effort should be made to get up an interesting exhibit. Whatever you do, do not buy dead space at such a gathering and dismiss it by posting a card "compliments of ..... company." Such an indifferent attitude won't make friends and it will carry the suggestion that the company is lacking in imagination and energy.

All newspaper space is expensive. Because it is expensive the most should be secured from it. This can be accomplished only by the utmost care in the writing of copy, the laying out of advertisements, and the utilizing of advertisements in different ways beside merely running them in the newspaper.

The purchase of newspaper space should be carried on on an absolutely business basis. The honest newspaper publisher will respect a company for this. Companies will make no mistake in telling the newspapers generally that they are buying space as a strictly business proposition, and that it is their intention to make it pay returns. In keeping with this statement, it should never expend one nickle for space in any special edition or in the so-called industrial pages. To put money in them is like dumping it into a gopher hole. The man who tries to sell you the space knows this and secretly he will admire your judgment in keeping out of his proposition, although he will dislike to lose the business and probably pretend he believes this "special" space invaluable.

Primarily, you should enter into annual contracts with your newspapers. This will give you a better rate than if you advertise only intermittently. Be sure that you get the regular commercial rate. Some utility managements are paying political and theatrical rates for space in their local papers. These are very high rates and no utility company ever should pay them. Rather than pay them, keep out of the papers. No fair publisher will demand them, nor will many publishers refuse long to accept utility advertisements at regular commercial rates.

Advertising should be continuous. It is better to run a small advertisement several times a week than to run a large one when trouble impends. Full pages should be avoided. Not only are they easy for the reader to turn over, but they also carry a suggestion that the company has unlimited funds to spend. Furthermore, few persons will read the text that generally is carried in a full page advertisement unless it happens to be a bargain day advertisement of a department store. Under ordinary circumstances the text of any advertisement should be confined to 300 words or less. Approximately a quarter of a page will display this amount of text nicely. A good size is 12 inches by three or four columns. The column length of the newspaper is 21 inches and if you use 12 inches this will run your advertisement slightly beyond the fold in the paper, and easily catch the reader's eye as he unfolds the sheet.

Do not make the mistake of using type that is too large or not clear. Some print-

ers are prone to "doll up" advertisements with fancy borders and run to odd faces of type. Tell your printer that you want the most readable type he has in the shop so that your advertisement will look as plain as possible. Newspaper readers are accustomed to reading Roman type in the news column, and the nearer you can approximate this in your newspaper advertisements, the better chance you will have to catch their eyes.

Body type in newspapers generally is about seven point. The next sizes in general use are eight, ten and twelve point. Ordinarily it is unwise to use type larger than twelve or fourteen point in the body of an advertisement. Most headlines should be set in 24, 36 or 48 point. If you use italics for emphasis, be sure that you get black face ones. Most italic faces do not show up very well on the printed newspaper page.

A good saying to keep in mind is that "Nothing important ever was said through a megaphone." In other words, do not imagine that by using the largest type in the shop you are going to get the most attention. One of the most important statements made in any advertisement printed in the last year appeared inconspicuously in six point type tucked away in a far corner of a certain securities advertisement. It said that John D. Rockerfeller, Jr., had agreed to take $250,000 worth of bonds. The fact that this was printed in small type made it more conspicuous perhaps than if it had been broadcast in bold face type.

Care should be taken not to set the text matter on too wide a measure. The average width of a newspaper column is two and one-quarter inches, or 13 ems. It is best to keep the length of a line somewhere within striking distance of this measure. Fifteen ems is a nice size. Seldom should copy be set in greater width than two columns, or four and one-half inches. Type set any wider than this is very difficult to read. Again the copy writer should keep in mind that newspaper readers are accustomed to following printed matter in column width, and that they are very much creatures of habit. They may read two column or even 3 column text for a short time, but they won't wade through many of these long measure paragraphs.

There is a growing tendency among the best writers to confine their columns to about 15 ems and set the text in several different columns. For instance, if you are using four column space, it is well to devote half a column on each side of your type matter to white space and set the text in two or three different columns.

It always should be borne in mind that very few people want to read advertising and they do want to read news matter. Therefore you should strive to make your advertising as easy to read, if not easier, than news matter. One of the surest ways to accomplish this result is to hold your column widths down.

The foregoing, of course, does not apply to headlines. While it is inadvisable to spread your headlines across six, seven or eight columns, there is no objection to them extending over three or four. A headline at best is only something to rivet the attention of the reader on the text. Every headline should contain a verb. This will give it action. Avoid label headlines such as "Announcements," "Public Notice," etc. Make your headline say something about the text.

Sentences and paragraphs should be short. The ideal sentence for an advertisement seldom embraces more than two lines of type. The shorter the better. Paragraphs should not be over one, two or three inches in length.

Great care should be used in the selection and use of cuts to illustrate advertisements. The wear and tear on cuts is terrific. When your cuts begin to show signs of wear, buy new ones. A poor, smudgy cut will detract greatly from your advertisements. If you are not getting results from your cuts, however, often it is the newspaper press that is at fault. The best cut in the world won't show up well if the press work is poor. Poor paper also will not reproduce cuts well. In hav-

(Continued on page 754)

The A. G. A. Exhibit

Facts and Figures About the Exhibition

More Than Seventy Per Cent Increase in Net Square Feet Sold Over Previous Year

By C. W. BERGHORN
Director of Exhibits

PRE-CONVENTION predictions that the Eighth Annual Convention and Exhibition would be the largest ever held by the American Gas Association were borne out. Of course we have heard criticisms but we have also had a greater number of favorable comments both from gas men and manufacturers than ever before which indicates that the 1926 convention and exhibit was the finest and most interesting ever held by the industry.

A journey through the exhibition halls was the equivalent of a liberal education in our business and told the whole story of gas.

The latest developments in apparatus for gas manufacture and distribution were displayed and every conceivable type of gas appliance was represented.

The facilities of the Million Dollar Pier made it possible to portray the industry in a logical sequence. First to be met on entering the exhibition halls were the manufacturers of gas apparatus, distribution equipment, measuring devices and gas-making accessories; then came the industrial boiler, hotel and restaurant equip-

Year	Location	Attendance	Per Cent Increase	No. of Exhibits	Per Cent Increase	*Net Sq.ft. Used	Per Cent Increase
1919	New York	2000	—	110	—	8,606	—
1920	New York	2500	25.0	110	0.0	10,343	20.2
1921	Chicago	2200	—12.0	112	1.8	9,518	8.0
1922	Atlantic City	2800	27.3	135	20.5	19,228	102.0
1923	Atlantic City	3400	21.4	165	22.2	24,972	29.9
1924	Atlantic City	3700	8.8	182	10.3	27,268	9.2
1925	Atlantic City	3831	3.5	208	14.3	35,500	22.9
1926	Atlantic City	4152	8.4	225	8.2	57,337	70.2

*This figure represents net sq.ft. used for exhibits. It is exclusive of aisles, etc.

The Testing Laboratory Exhibit

The Accounting Section Exhibit

ment manufacturers, followed by the range, water heater, house heating, incinerator, laundry equipment and other domestic appliance manufacturers. At the very end of the halls, the gas-fired refrigerator exhibits gave the dramatic touch to the whole.

The compilation in the accompanying table tells an interesting story, showing that the growth of the convention and exhibition have been phenomenal.

The first A. G. A. Convention was held in 1919, with 2000 in attendance and with 110 exhibits, requiring 8606 net sq.ft. Comparing the figures of 1919 with those of the 1926, we find that the attendance has doubled, the number of exhibits doubled and the space requirement has increased over six and one-half times. Also, the average space requirement per exhibit increased from 78 sq.ft. in 1919 to 254 sq.ft. in 1926. It must be remembered, however, that the convention was held in various cites during the past eight years, which is a factor to be taken into consideration. It may, therefore, be more indicative if we compare only those conventions which were held in the one city. We then find that since 1922, the year of the A. G. A.'s first convention in Atlantic City, the attendance has increased 49 per cent; the number of exhibits 66 per cent, and the space requirement 200 per cent. The space requirement per exhibitor during this period increased from 142 sq.ft. to 254 sq.ft.

All credit for this remarkable growth is due the manufacturers who have given their support to the exhibition and have in turn enjoyed the advantages of displaying their products before the assembled industry.

A Primer for the Advertising Manager

(Continued from page 752)

ing designs drawn for cuts, avoid fine lines and detail. Fine lines are satisfactory if they merely represent an outline of the figure shown, but they should not show any more detail than the mere outline.

Keep the news end of your newspapers in touch with your advertising campaigns. Some companies mail copies of their advertisements regularly to city editors. It is a good idea.

Good results can be obtained from billboards. This sort of space is not as valuable as street car or newspaper space but it is good. Confine your billboard text to as few words as possible. The Dodge Motor Car Company does some of the best billboard advertising in the country. It seldom contains more than three or four words of text. Sometimes only one. There is a great opportunity for obtaining artistic effects on billboards.

INDUSTRIAL GAS SECTION

H. O. LOEBELL, Chairman — F. C. MACKEY, Vice-Chairman

C. W. BERGHORN, Secretary

A Continuous Malleableizing Kiln

By GEO. BLAKNEY

Superintendent, Northwestern Malleable Iron Co., Milwaukee, Wis.

THE annealing or heat treating of malleable iron is as important a step in the producing of malleable castings as is the melting. The term heat treating malleable iron is perhaps a misnomer for the changes in annealing are fundamental, the properties of the hard iron before it is annealed are so modified that a different product emerges from the annealing ovens after the interval of time necessary to change the combined carbon to the free form of temper carbon. In fact, malleable iron is not malleable until it has been annealed.

The time consideration is a prominent factor in producing malleable castings. Obviously, with the large periodic ovens, the time of the anneal is greatly lengthened by the requirement of reheating the entire oven after each anneal and by the length of time necessary for loading and unloading the oven. Also with increased production an increased number of ovens are required. Further, the length of life of the pots, which comprise about 60 per cent of the total weight going into the oven, is greatly increased in the continuous kiln.

For these reasons the development of the tunnel type of continuous oven, through which pots of castings are passed in regular sequence, represents a long step forward in malleable practice. This type of oven is adapted to productions varying from 15 tons of castings per day to 75 tons per day.

With the adoption of the continuous malleableizing kiln, the next most important question was the selection of a fuel. The selection of city gas was made only after deep consideration of the various means of supplying heat, including coal, oil, electricity and producer gas. Coal, the cheapest of the fuels, was eliminated on account of the difficulty of the application of remote, automatic temperature controls. Oil was next eliminated because of its severity on refractories and the expensive auxiliary equipment necessary to burn oil successfully and economically. Electricity was found too uneconomical on account of the length of time that the work must be held at temperature and the slow cooling time required. Producer gas was eliminated because of the additional cost of several thousands of dollars for the cost of a producer plant and the additional problems that present themselves on the manufacture of gas. Therefore, city gas was selected because there is no handling of fuel or storage expense or ashes to dispose of, the refractories have a longer life due to the constant rate of heat application and constant temperature, the application of remote, automatic temperature control apparatus is comparatively easy and inexpensive, and longer life of pots is secured due to automatic control of atmosphere inside the tunnel.

Our annealing oven has been in continuous operation since April 1st of this year. The oven is designed to anneal 25 tons of castings per day of twenty-four hours, and is approximately 195′ 5″ long overall including the two end vestibules and 17′0″ wide and approximately 15′9″ high overall. The main tunnel consists of three zones, the first or preheating zone is 20′0″ long and contains the outlet flues for the products of combustion. The second or soaking zone is 75′0″ long and

Presented at the Industrial Gas Section Meeting at the A. G. A. Convention, Atlantic City, N. J.

contains the burners of which there are 72 in number. The last or cooling zone is 85'0" long, thus making the actual effective length of the tunnel 180'0" long.

An outstanding feature of this furnace is in the design of the tunnel, which, instead of being built solid from the floor, is open the full length on both sides from the bottom of the kiln. The sand seal extends the full length of the kiln on each side. The side of the kiln rests on girders and plate members extending above the floor, leaving a 14" open space along both sides of the kiln extending down to the floor. This permits a free circulation of air underneath the cars, so that the wheels and bearings are exposed to the atmosphere and there is no need of water or air cooling pipes. The cars are well insulated, and, with air circulation beneath them, the temperature of the car bearings never exceeds 120 deg. F. Keeping the bearing comparatively cool has eliminated to a great extent all bearing troubles.

In addition to providing for the circulation of air under the kiln, a pit of 6'0" deep with entrances at intervals along the side of the foundation, extends the full length of the kiln beneath the car track. This permits access to the bottom of the cars, so that bearings or wheels can be replaced or other repairs made to the cars without interrupting or interfering in any way with the operation of the kiln. An axle can be jacked up and repairs completed before the time comes for the car to be moved along the track by the charging of another car into the kiln.

Another characteristic of the kiln construction is the semi-muffle feature. The semi-muffle feature has several advantages over the muffle, the most important being lower cost, both of the installation and the maintenance, a freer circulation of heat in the tunnel, thereby eliminating cold spots which result in under annealed iron, a somewhat better thermal efficiency. By admitting the products of combustion into the tunnel proper, the atmosphere around the pots can be varied from reducing to oxidizing, whichever is the most favorable for lengthening the pot life.

The tunnel is built of fire brick and insulating brick and is entirely enclosed in a structural steel I-beam and plate frame. The pit beneath the tunnel is 6'0" deep and 3'6" wide and concrete walls and floor. Above the pit are six-inch channel cross ties, at a level with the top of the track rails. The outlet flues are located near the charging end, all products of combustion passing up through a stack at that end.

The cars have structural steel substructures with cast iron tops and a superstructure of fireclay blocks and insulating brick. The cars are approximately 7'0" wide, 6'0" and 3'0" high, the wheels have roller bearings. The track gauge is 4 x 2½".

The operation of the kiln is as follows: Castings are placed loose in the pots. The pots are standard design, 20" high, and have trunions at the two diagonally opposite corners to permit lifting and dumping with crane slings. The average weight of castings in each pot is 390 lbs. A car is loaded with 24 pots in six stacks, four pots high. The loaded car weighs about 22 tons of which about 5 tons are castings. A loading and unloading track extends along one side of the kiln and pots are handled with an electric traveling crane. There is a short transfer track at each end, by means of which a tractor moves the cars outside the kiln. Before entering the kiln the cars pass through a gauge conforming to the clearance inside the tunnel to avoid danger of the cars being loaded unevenly. After a car is pushed into the vestibule the door to the vestibule is closed. The door to the kiln proper is then opened and the car is pushed into the tunnel by means of a hydraulic ram. A car being pushed into the tunnel pushes the other cars along. A kicker cylinder under the track provided near the discharge end pushes the end car out onto the transfer, thus doing away with the necessity of using pinch bars.

The temperature at the charging door, in the preheating zone, is 650 degrees.

(Continued on page 759)

COMMERCIAL SECTION
J. J. BURNS, Chairman — G. M. KARSHNER, Vice-Chairman
J. W. WEST, Jr., Secretary

Home Making—A Business

A Typical Home Service Lecture Used Before Women's Organizations When No Appliance Demonstrations are Given

By ADA BESSIE SWANN
Director, Home Service Department, The Public Service Electric & Gas Co., Newark, N. J.

THIS lecture, which was given by Miss Swann at the Home Service booth at the Convention in Atlantic City, N. J., is a typical inspiration talk for presentation before women's organizations. It does not attempt to sell gas; it does attempt to sell women on the idea of homemaking.

BIG business, as it is termed today, usually means a tremendous organization banded together under the direction of wise men and women, to accomplish some particular piece of work. In an industry it is the same and in these large organizations, we have many departments. We have what we call the creative department, where the ideas and plans for carrying on the work originate. Then, we have the many other departments needed to execute those plans, such as the department of revenue, which is concerned with the business of collecting money to successfully operate the business, the distribution department, the bookkeeping department, the advertising department, the service department and today we hear a great deal about the public relations department. Then, of course, there is the maintenance department which includes the group of workers that are employed to keep the properties of the organization clean, shiny and always presentable.

Does this business of homemaking have such departments? Yes, indeed, but unlike great organizations, the head of the many departments is the woman in the home. There is a place, too, of course, for the partner and he is rightly at the head of the department of revenue. But, you, the woman, are at the head of every department from the purchasing and distribution to the janitor service of your home, and because the business of homemaking depends so entirely upon the ability of one head, it behooves us as women to know this business of homemaking in all its departments thoroughly.

Often I have heard a child remark, "we had lemonade and cookies for breakfast this morning, because mother didn't get up and we didn't feel like eating anything else."

A business, to be properly run, has hours and the head of that business cannot lie abed and expect business to operate successfully. It does seem hard, perhaps for one member of the family to arise a half hour earlier than the other sleepy heads, but her job demands that, and she can make up this half hour of early rising later in the day, when her business for the day has been successfully started or completed.

The woman who is lazy and irresponsible cannot expect to have healthy, growing children, sending them to school on lemonade and cookies, or coffee cake and tea. These do not build up resistance

Miss Swann delivering her lecture at the A. G. A. Booth in Atlantic City

or strength for the children to go through the morning.

The same type of woman usually is out by luncheon time, because she has so many things to attend to away from her home—a bridge party on Monday, the club on Tuesday, shopping on Wednesday, a committee meeting on Thursday, a bazaar on Friday, and so the week goes.

Life to her is one round of activities, outside of the home. I sometimes call this type of a woman the community homemaker—she is so busy attending to affairs outside of her home that she is rendering an unsatisfactory service—as a homemaker in attempting to keep up with the life of the community or her neighbors by being in the "swim," of as many activities as she can possibly crowd into her week. So that the same little children who went to school without breakfast come home to a luncheon of crackers and other delicatessen food which has been set out on the table for them, then hurry back to school. Sometimes they have headaches, some times they are just tired, and we wonder why?

At four o'clock, when school is over, a few more crackers. At dinner time, this irresponsible sort of a mother tries to take care of her family by doing in a half hour things that should have had careful consideration and more preparation, serving a dinner of boiled potatoes, fried meat and "store cake," giving her family foods that are easiest to get and prepare.

This woman finds fault when her husband does not come home to dinner—if she cannot get up to have breakfast with him, why expect him home to dinner?

Such a woman is not a good homemaker, and is going to be left far behind in this job of homemaking. The word "failure" can be written after her name and probably after the name of her children, because it is the training in the home that makes men and women successful.

Another type of woman is the one who is constantly fussing and fuming and worrying. She worries about her husband, she worries about the children, usually most unnecessarily. She makes their lives miserable with her constant questioning and "nagging."

She may be what the community would call a wonderful housekeeper, but at what a cost to her family. Yet, we find no peace or happiness in her home among the members of her family. They in turn, in worrying about her, become cross and irritable, because she wears out herself and them with too much work and too much worrying.

We have the pessimistic woman. How many business men can tell you their success has been retarded because of the pessimistic attitude their wife has taken toward new ventures. We need to be courageous. We need to have the spirit of adventure, because when opportunity knocks for the person or the partner in charge of the department of revenue of this business of homemaking, he needs the substantial support of every other department in this business.

I think that most of these types of homemakers are developed because of the old time theory that homemaking is a drudgery and that keeping a home required no special training—any woman was fitted for it. It seemed to offer so much more time for a woman than working in an office, that she looked upon it as a haven from all of the worries and troubles that had beset her.

I recall a class of young brides, one of whom boastfully announced that she

had been married six months and all she knew how to make was mayon-NAISE and coffee, that Ned adored club sandwiches and that they had them about three nights a week for dinner.

Today we realize that it is a big job, girls are training themselves more and more to be successful homemakers, and we, as women of experience, women who have fought through to a successful and well-done job as homemakers, should constantly encourage and teach younger women about this serious business of making a home.

Pay day for the homemaker? Yes, why not? If you have managed the budgeting system or the bookkeeping of this business, you should be able to write, at the end of the week, your own salary check. It depends on your good management and on the budget how much that salary check amounts to.

There is another pay day that comes every once a week and as pay day usually comes on Friday or Saturday, let us see how we merit pay day.

Can you say on Saturday morning, when you are going over the bookkeeping accounts of your business, "My, we had a good week this week. The books are checked, saved so much from this week which will go toward my next week's supplies and I am delighted, because I wanted to have company and I can without taxing the budget. John's been well all week, hasn't had indigestion once. He has been in a happy mood, smiling, just felt fine all week. The children have been well, too. In fact, as I recall the children in this neighborhood, I think my children are about the healthiest and happiest children on the street."

That is your pay day—mental satisfaction and the assurance that your duties as a homemaker are proven successful, by the happiness, peace of mind and healthful condition of the loved ones you serve.

Homemaking is a big business—your gas company knows it and through its home service department is ever ready to help you.

Malleableizing Kiln

(Continued from page 756)

This comes up to a maximum of 1700 degrees in the soaking zone and at the discharge end of the cooling zone it is approximately 900 degrees. The burners in the soaking zone are divided into four sections with separate manifolds and individual controls. The first manifold, starting at the charging end, is set for 1500 degrees, the second for 1650 degrees and the last two each for 1700 degrees.

The kiln is being operated at present on a 120 hour cycle and a car is being pushed into the tunnel every four hours. Forty-eight cars are used, of which 30 cars are in the kiln. Eighteen cars are on the loading and unloading track.

Of those in the kiln, three are in the preheating zone, thirteen are in the holding or soaking zone and fourteen in the cooling zone. The operating schedule makes it possible to run the kiln over a three-day layoff of the packing and loading crew. One man is all that is required to look after the kiln and auxiliary equipment.

The furnace is fired with 520 B.t.u. gas supplied by the city gas plant. Gas is taken from low pressure mains and by means of a compressor is raised to ten pounds pressure and piped to the burners at this pressure. Air is inspirated at the burners by the velocity of the gas passing through an orifice, thus eliminating all air piping or auxiliary air compressors. After several analyses of the flue gases the air shutters on the burners were adjusted and as long as the specific gravity and quality of the gas remains constant the mixture of gas and air also remains constant. Thus the atmosphere inside the tunnel is automatically maintained constant.

At the present schedule of six cars per day the gas consumption is 1¼ cubic feet of gas per pound of metal raised to 1650 degrees and maintained for 36 hours. Of the total weight of metal raised to the above temperature only about 32 per cent are castings, the remaining 68 per cent are pots, stools and covers. This per-

centage, of course, varies with the class of work being packed. Our work consists principally of automobile and railroad castings.

Since the kiln was put into operation we have been getting 100 per cent perfectly annealed castings and the same pots are still in use that were started. At the present rate of $.488 per thousand cubic feet of gas our fuel cost is $3.71 per ton of castings annealed as against $2.10 per ton in our periodic coal fired ovens. This difference of $1.61 per ton in fuel cost will necessarily have to be saved in the longer life of pots and the advantage of a quick anneal. Although our kiln has not been in operation for a sufficient length of time to collect complete data it is doubtful if this difference in fuel costs can possibly be made up without a further reduction in gas rates.

Tax Board Puts O.K. On Trade Associations

THE legitimacy of the trade association as one of the instruments by which business achieves its ends is further supported by a decision of the Board of Tax Appeals to which attention is called by the Chamber of Commerce of the United States.

By the decision in question the Board held that a contribution to a trade association as a pro rata share of fees of attorneys employed to test the constitutionality of the prohibition amendment was a legitimate business expense and could be deducted as such in the income tax return.

The taxpayer, a brewer, in 1919 paid dues to a local association, a state association and a national association, all devoted to brewing interests. All the brewers' associations in question, it was held, were performing useful services for their members and such services were in furtherance of the member's business.

Utility Management

(Continued from page 744)

when an industry ceases to be a trade and becomes a profession. That is to say: After bitter struggles between its members and with the public it has evolved a code of ethics or standards for the guidance of the conduct of its members which is greatly superior to the standards of the past and challenges comparison with those of generally recognized professions. It has come at last to recognize in a very marked degree its primary responsibility to the public, and Service has become the watchword of the industry.

In addition, every man and woman is rapidly coming to realize that each act done in rendering that service is impressed with a public interest.

The world recognizes these as the essential characteristics of a profession as distinguished from a trade.

As the years go on it needs no gift of prophecy to predict that service with these great utilities will be eagerly sought, and will be looked upon with equal favor as the great professions. It is increasingly evident that the men and women of today crave an opportunity for service to their fellow man. They are no longer satisfied with only bread and meat. They recognize a responsibility to society.

These great public service companies afford boundless opportunities to satisfy that natural longing. In that field they will again and again be thrilled with a sense of great responsibility for the welfare and happiness of the communities they serve and will be fully compensated for their arduous labors by the realization that they are rendering an essential service.

In view of the wide distribution of public utility stock—the diffusion of ownership—which is taking place, it becomes a matter of the greatest importance that the management and operation of these properties shall be in the hands of a professional class which is bound by such a high standard of conduct and which has such a deep sense of its responsibility to the public. It constitutes a strong protection against radical and ill-considered changes in policy. It is a welcome assurance to the public that whatever the result of the struggle between competing groups of financial interests for control, these great public utilities will still continue to be operated and managed by men and women who as a class have dedicated themselves to the public service.

TECHNICAL SECTION
WALTER C. BECKJORD, Chairman HARRY E. BATES, Vice-Chairman
H. W. HARTMAN, Secretary

Economics of Pressure Gas Storage

By A. F. BRIDGE
Southern Counties Gas Company, Los Angeles, Cal.

IT recently became necessary to formulate a plan for additionl gas storage on the natural gas system of Southern Counties Gas Company.

This system comprises an interconnected network of transmission lines supplying natural gas to some 66,000 consumers in Southern California communities scattered over an area of 990 square miles. The sources of supply are thirteen gas fields located in Los Angeles, Orange and Ventura counties. Field compressor stations deliver gas into the transmission lines at a pressure of 275 lbs., and the isolated distribution systems are fed through district regulators at pressures ranging from twelve inches to seven pounds. Increase in domestic peak demands, accompanied by gradual decline in natural gas supply necessitated supplementing hourly capacity of primary sources by delivery from storage.

It is estimated that peak day requirements in 1930 will be approximately 42,000 M. cubic feet; and as net line pack of 2,800 M. cubic feet is available, and now utilized, additional storage of about 6,000 M. cubic feet will be required by 1930, in order to equate pipe line deliveries from field stations.

A study was made of various types and arrangements of storage facilities to determine their relative merits, particularly from an economic standpoint.

Among the more important elements involved in a study of this problem are:

Annual cost per unit of capacity
- Investment costs.
- Operating expenses.

Concentrated vs. distributed storage, in relation to
- Effect on delivery capacity of transmissions facilities.
- Reliability of service.

Presented at a recent meeting of the Pacific Coast Gas Ass'n and brought up to date for the Monthly by the author.

High pressure storage holder used by the Southern Counties Gas Company

Adaptability to existing and future load and supply conditions.

Comparison of high pressure and low pressure storage, involving in addition to the above matters,

Sendout capacity.

Automatic control.

Sightliness and noise (nuisance characteristics).

Conservation of gas (independent of cost aspect).

Increment installation, resulting flexibility of program, and reduced average fixed charges.

Since storage is provided for the purpose of improving or maintaining service and hence is a non-revenue producing betterment, except to a minor extent, the total annual cost is the controlling factor, and will be considered first.

Obviously there are numerous plans which might be adopted for additional storage, which may be classified broadly as follows:

Arrangement:

C. Concentrated—A large centrally located holder station serving the entire system, or a major district.

D. Distributed—Relatively smaller holder stations located at transmission line termini in important centers of distribution.

Type:

L. Low Pressure—Telescopic or mechanical piston type, operating at pressure of 0.2—0.3 lbs. and requiring a compressor plant to discharge the stored gas.

H. High Pressure—Compression tank or water displacement type, automatic, non-attended, input and output controlled by regulators, storing gas at pressures ranging from 30 lbs. to 50 lbs.

To test the relative costs of the various alternatives, comparison was first made of two plans, each involving a total of 6,000,000 cubic feet of storage capacity.

PLAN C-L

One of these, which is typical of both C. and L. in the classification covers the installation of a 6,000,000 cubic feet waterless, low pressure, holder station near the load center of Orange County District, one of the five major districts of this system. This holder would indirectly provide storage for the entire system by supplying all of the local (Orange County District) load, up to the limit of its capacity, during peak periods, thus releasing pipe line delivery to other districts. Gas would be discharged from this holder into the district transmission mains by means of reciprocating compressors direct driven by four cycle gas engines. Under our conditions, the latter is the most economical and reliable prime mover available.

This holder station and the necessary pipe lines radiating from it to the several distribution centers, which comprise the district, were designed, and annual costs computed, for compressor station discharge pressures of 100 lb., 50 lb., and 25 lb., which plans are designated C-L-1, C-L-2, and C-L-3 respectively. Since the district transmission system is now fed at three points from primary transmission lines at pressures of 150 lb. 175 lb., some reinforcement is necessary for all three of the conditions assumed.

From analysis of typical load charts, we find that with a district peak day sendout of 7,700 M. c.f. the holder can be completely discharged in a 14 hour period, with a peak hour of 640 M. c.f. Utilizing the holder to carry the entire district load improves the hourly-daily load factor, it being about 50 per cent as compared with 20 per cent for the usual arrangement where the holder station supplies only the load in excess of average hourly sendout.

PLAN D.-H.

The alternative plan comprises a total of 6,000,000 cubic feet of high pressure storage in units of 100,000 cu.ft. or more, and located in various distribution centers as may be prescribed by load conditions. As the number and location of the high pressure holder installations will not appreciably affect the total cost, it is nec-

SUMMARIZED COMPARISON OF ANNUAL COST OF 6,000 M. CUBIC FEET OF GAS STORAGE

TABLE No. 1

Item No.	Plan C-L-1 Description	Cost	Plan C-L-2 Description	Cost	Plan C-L-3 Description	Cost	Plan D-H Description	Cost
(1)	6,000 M. cu.ft. waterless low pressure holder erected, exclusive of foundation	$382,000	Same as Item 1, Plan C-L-1	$382,000	Same as Item 1, Plan C-L-1	$382,000	6,000,000 cu.ft. capacity in pressure holders in units of 250,000 or greater	$648,000
(2)	Gas engine driven, 2 stage compressors totaling 1750 horsepower, discharge pressure 100 lb. installed including auxiliary equipment	200,000	Same as Item 2, Plan C-L-1 except total 1600 horsepower single stage, 50 lb. discharge pressure	190,000	Same as Item 2, Plan C-L-1 except 930 horsepower, single stage, 25 lb. discharge pressure	132,000	Piping and regulators for 6 holder stations	15,000
	Secondary transmission reinforcement required to fill and discharge holder 41,000‡ of 8" line	68,000	Same as Item 3, C-L-1 except 59,500′ of 6", 8" and 10" lines	110,100	Same as Item 3, C-L-1 except 73,700′ of 6", 8", 10", 12" and 15" lines	161,000	Secondary transmission reinforcements or extensions	20,790
(4)	Total holder station and additions to transmission system	650,000		682,100		675,000	Total holder stations and additions to transmission system	863,790
	ANNUAL COSTS							
	Interest at 7%	$ 45,542		$ 47,747		$ 47,250		$ 47,865
	Depreciation (6% Sinking Fund Basis) Holders (40 year life)	2,648		2,648		2,648		4,417
	Compressor Station (15 year life)	8,592		8,162		5,671		565
	Pipe Lines (20 year life)	1,865		2,993		4,376		
	Total fixed charges	$ 58,647		$ 61,550		$ 59,945		$ 52,847
	Operating Expenses							
	Maintenance Pipe Lines	$ 200		$ 300		$ 400		$ 70
	Maintenance Holders	1,600		1,600		1,600		3,200
	Compressor Plant Operations							
	Labor (8 operators)	14,700		14,700	Labor (5 operators)	9,900		
	Fuel (Fuel Economy) 10 cu.ft. per H. P. hour value of 25c per M. cu. ft.	13,414		12,279		7,159		
	Lubricants	2,137		2,004		1,282		
	Maintenance	2,500		2,500		1,500		
	Insurance	3,000		3,000		2,400		
	Total Operating Expenses	$ 37,551		$ 36,383		$24,241		$ 3,270
	Total Annual Costs	96,198		97,933		84,186		56,117

essary to determine same only approximately for purposes of comparison. The costs of land and foundations are not included in any of the plans in order to simplify the estimates, and because variations in these costs would have a negligible effect on the total cost.

For purposes of this study it is assumed that these holders will be located in six widely separated cities where storage capacity ranging from 300 to 2,000 M. cu.ft. can be utilized. High pressure storage requires transmission line delivery for filling, and this condition is met adequately by existing facilities except in two places where certain transmission main extensions are necessary.

Quotations have been obtained on high pressure storage covering a variety of types, sizes, and maximum working pressures. The selection of type, unit size, and working pressure are governed by local conditions for each holder site. There are two general types—the compression tank, either spherical or cylindrical with hemispherical ends and the cylindrical, hydraulic-displacement type. The first type is cheaper for maximum working pressures above approximately 30 lbs. and the second type at lower pressures. Practical sizes of units range from 100 M cu.ft. to 500 M cu.ft. dependent on type and working pressure. Prices, which are rather independent of unit size, range from $102,000 to $134,000 per million of net capacity, based upon a minimum

sendout pressure of 5 lbs. All quotations are based on a maximum working tensile stress of 13,750 lbs. per sq.in., corresponding to a safety factor of four.

An average price of $108,000 per million cu.ft. of net capacity is used for purposes of comparison, exclusive of foundations, piping and regulators.

Table I shows the direct savings obtainable with Plan D. H. as compared with the other three involving the use of concentrated low pressure storage. It should be noted that the annual fixed costs do not vary widely, most of the economy in Plan D. H. resulting from elimination of compressor plant operation. While the investment in secondary transmission mains depends entirely on conditions peculiar to the district selected for storage installation, it should be observed that even if this item and its accompanying fixed charges be entirely eliminated, the least annual saving due to Plan D.-H. is $14,000.

A reduction in fixed charges and labor might be accomplished by substituting electric motors for gas engines in the compressor station, but, at prevailing rates, the increased cost of energy would more than offset this saving. Furthermore, the sacrifice in reliability of operation accompanying such a change would condemn it from a service standpoint, unless power is available from two independent electric systems.

There are, however, other important advantages associated with Plan D.-H. which are difficult to determine quantitatively but which have a definite effect on both the cost and quality of gas service. Some of these result from the locating of storage at various distribution centers, others are due to high pressure storage.

Among those due to distributed storage are the following:

If storage is provided at termini of transmission lines, properly proportioned to the various terminal loads, the daily capacity of most of the transmission system is approximately doubled as compared with its capacity when centralized system storage is employed, since the peak hour is about twice the average hourly sendout. In other words, centralized storage serves only to equate the load on production sources and certain primary lines connecting these sources with the central holder, whereas distributed storage will equalize delivery both from sources and from the entire transmission network.

There is of course a practical limit to the subdivision of storage facilities, which is controlled by the increase in cost per unit of capacity accompanying the reduction in size of holders, in maintenance, and related factors.

These general principles are clearly set forth in a report of a committee on increasing distribution capacities (A. G. A. 1921) which is briefly quoted as follows:

> If ideal distribution of gas could be attained there would be a miniature gas holder on every customer's premises which would be of such size as to supply his need for gas during the demand periods, and in which the supply would be replenished when his demand ceased. The load factor on mains and services would be one hundred per cent since an equal rate of flow into the numerous holders would be going on at all times. The size of mains and services would be very small since they would not need to be proportioned to meet any peak demands.
>
> These ideal conditions cannot be attained on a practical scale using so many small units, but similar conditions can be obtained by the adoption of larger units, namely district holders.
>
> The exact sizes of district holders is a question to be determined largely by the conditions prevailing in a given system. It is evident that a great number of small holders more nearly approach ideal conditions than a small number of large holders, but the operating costs might render the large number impractical. A half million cubic foot holder seems like a rather workable size for cities with an output of upwards of ten million feet per day.

In a system such as that under consideration, consisting of a number of isolated communities supplied from long transmission lines, it is obvious that reliability of service is promoted by distribution rather than concentration of storage. This effect is not confined to actual interruption of service due to breakage of pipe lines, compressor station trouble, etc., as experience has shown that sudden

increases in load frequently result in shortages in districts or communities remote from production sources or where supply lines are heavily loaded. Storage within a district provides a secondary source of supply entirely controllable by the district and instantly available.

In planning for storage, which is generally assumed to have an operative life of 40 years or more, it is important to foresee the probable changes in supply and load conditions in order to provide holders of such type and so located that their usefulness will be unimpaired by changing conditions. Sources and quantity of supply have varied frequently in the past on this system and will continue to do so.

We next proceed to compare annual costs for typical examples of D-L and D-H, that is, a low-pressure and a high-pressure holder station each serving a single distribution system. This condition requires an hourly delivery capacity from storage equivalent to about 22% of holder capacity.

Due to the low load factor, no spare compressor has been included, even where the station contains but a single unit. A distribution pressure of five lbs. has been assumed.

Table No. 2 shows comparative costs for installations of 2000 and 1000 M.cu.ft. It should be noted that in the latter case, the first cost of the holder alone is less for high-pressure storage.

The figures given in Table No. 2 are independent of local conditions and applicable to any holder station of like size, where gas is distributed from storage at about five lbs. pressure. In the case of a system where the distribution pressure is low enough to permit delivery from a low pressure holder without boosting, economies are obtainable with high pressure storage when the station capacity is 1000 M. cubic feet or less.

Salient advantages of high pressure storage other than direct annual costs include the following:

The peak hour sendout capacity is practically unlimited, whereas, in the case of a low pressure holder, it is restricted to the capacity of compressors both as to pressure and volume. Thus a high pressure holder may be entirely discharged in one hour, if distribution main capacity permits. This feature greatly increases the flexibility of storage operation, especially in meeting unexpected or emergency peaks.

One million cu.ft. net capacity here

Part of the capacity of high pressure storage is available at pressures above the normal distribution pressure, which makes possible feeding secondary transmission lines direct from storage. This practice is now followed at one point, and is planned for holders under construction at two others. Thus, in the case of holders designed for a working pressure range of five to fifty pounds, the percentage of net capacity available above various pressures is as follows:

	Compression Tank Type	Water Displacement Type
Above 5 lbs.	100%	100%
Above 10 lbs.	89%	92%
Above 15 lbs.	78%	86%
Above 20 lbs.	67%	78%
Above 25 lbs.	56%	68%

As a result of the above, if conditions require, either temporarily or permanently, the use of a higher delivery pressure than that designed for, this is accommodated by a high pressure holder without any modification, and results only in a slight loss of capacity. If, as will usually be the case, the abnormal pressure is required to meet the morning peak demand, there will be no sacrifice of capacity.

SUMMARY OF ANNUAL COSTS FOR LOW PRESSURE AND HIGH PRESSURE HOLDER STATIONS LOCATED AT DISTRIBUTION CENTERS

TABLE No. 2

INVESTMENT

2,000 M. cu.ft. Holder				1,000 M. cu.ft. Holder			
Low Pressure Description	Cost	High Pressure Description	Cost	Low Pressure Description	Cost	High Pressure Description	Cost
2,000 M. cu.ft. waterless low pressure holder erected, exclusive of foundation	$176,000	2,000 M. cu.ft. of high pressure storage exclusive of foundation	$216,000	1,000 M. cu.ft. waterless low pressure holder erected, exclusive of foundation	$123,000	1,000 M. cu.ft. of high pressure storage erected exclusive of foundation	$108,000
Compressor station 2—160 horse power gas eng. driven 15 lbs. discharge pressure capacity 400 M. per hour	44,000	Piping and regulators for holder station	2,500	Compressor station 1—160 horsepower gas engine driven. 200 M per hour	22,000	Piping and regulators for holder station	2,500
Total Investment	$220,000		$218,500		$145,000		$110,500
ANNUAL COSTS							
Interest at 7%	$ 15,400		$ 15,295		$ 10,150		$ 7,733
Depreciation Holders 6% S. F. basis (40 year life)	1,137		1,420		795		718
Depreciation Compressor Plant (15 year life	1,890				945		
Total Fixed Charges	$ 18,427		$ 16,715		$ 11,890		$ 8,453
Operating Expenses							
Maintenance of Holder	870		930		440		
Labor	5,760				5,760		470
Fuel—10 cu.ft. per H. P. hour at 25c per M.	1,226				613		
Lubricants	281				140		
Maintenance Compressor Plant	400				200		
Insurance	600				400		
Total Operating Expenses	$ 9,137		$ 930		$ 7,553		$ 470
Total Annual Cost	27,564		17,645		19,443		$ 8,923

When installed in cities having low pressure distribution systems, the net capacity is increased by ten per cent or more and costs per M. cu.ft. of capacity given above are reduced correspondingly. This condition exists in three places.

High pressure storage in contrast to low pressure:

Has no moving parts, hence will not wear out nor get out of order. Is automatic in operation, and unattended, hence does not fail to function due to human negligence.

Can be constructed in any desired combination of sizes, arrangement of units, and ratio of height to diameter, without materially affecting its cost, hence can be adapted to available sites and rendered unobjectionable to owners of adjoining property.

Operation is not accompanied by noise, odor or other nuisance.

Does not require natural gas fuel for operation. In the face of a declining gas supply and increasing distances from source to market, which already has necessitated triple compression of gas, in some cases, this feature is very important.

Lastly and possibly most important, it can be provided in increments when and where load and supply conditions may require, without adversely affecting the final cost; hence the present cost of service need not be overloaded by fixed charges on unused capacity.

As a result of this cost analysis, a program of pressure storage construction was inaugurated in 1925, and six stations totalling 2,100 M. are now operating successfully. The accompanying photographs show some of these holders both under construction and in service. Additional installation are scheduled for 1927.

An installation under construction

Associations Affiliated with A. G. A.

K. R. Boyes, Secretary

Canadian Gas Association
Date of Affiliation—Mar. 25, 1919.
Pres.—J. J. Armstrong, Consumers Gas Co., Toronto, Ont.
Sec.-Tr.—G. W. Allen, 7 Astley Avenue, Toronto.
Conv., 1927.

Empire State Gas and Electric Association
Date of Affiliation—Nov. 21, 1919.
Pres.—H. M. Brundage, Consolidated Gas Co. of New York, New York, N. Y.
Chairman Gas Section—J. E. Cooper, Utica Gas & Electric Co., Utica, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Conv., Lake Placid Club, Lake Placid, N. Y., Oct. 6 & 7, 1927.

Illinois Gas Association
Date of Affiliation—Mar. 19, 1919.
Pres.—W. A. Bertke, Illinois Power & Light Corp., East St. Louis, Ill.
Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., 1927.

Indiana Gas Association
Date of Affiliation—April 24, 1919.
Pres.—E. Van Arsdel, 1100 J. F. Wild Bldg., Indianapolis, Ind.
Sec.-Tr.—E. J. Burke, Room 1314, Peoples Gas Bldg., Chicago, Ill.
Conv., 1927.

Michigan Gas Association
Date of Affiliation—Sept. 18, 1919.
Pres.—C. R. Henderson, Washtenaw Gas Co., Ann Arbor, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., Grand Hotel, Mackinac Island, Mich., July 5, 6, 7, 1927.

Mid West Association
Date of Affiliation—May 21, 1919.
Pres.—Frank S. Edge, Peoples Light & Fuel Co., Grinnell, Iowa.
Sec.-Tr.—H. R. Sterrett, 551 Seventh St., Des Moines, Ia.
Conv., St. Paul, Minn., April, 1927.

Missouri Association of Public Utilities
Date of Affiliation—June 18, 1920.
Pres.—F. S. Dewey, Kansas City Power and Light Co., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Conv., 1927.

New England Gas Association
Pres.—F. C. Freeman, Providence Gas Co., Providence, R. I.
Pres. Operating Div.—G. Warren Stiles, Portland Gas Light Co., Portland, Me.
Sec.-Treas. Operating Div.—F. E. Drake, Lynn Gas & Electric Co., Lynn, Mass.
Pres. Sales Div.—M. B. Webber, Marlboro-Hudson Gas Co., Boston, Mass.
Sec.-Treas. Sales Div.—J. H. Sumner, 719 Massachusetts Ave., Cambridge, Mass.
Pres. Industrial Div.—R. J. Phelan, Worcester Gas Light Co., Worcester, Mass.
Sec.-Treas. Industrial Div.—J. J. Winn, Jr., Fall River Gas Works Co., Fall River, Mass.
Conv., Bancroft Hotel, Worcester, Mass., Feb. 23 & 24, 1927.

New Jersey Gas Association
Date of Affiliation—April 25, 1919.
Pres.—L. N. Yetter, Atlantic City Gas Co., Atlantic City, N. J.
Sec.-Tr.—Louis Stoecker, Public Service Electric & Gas Co., Newark, N. J.
Conv., Bellevue-Stratford Hotel, Philadelphia, Pa., April 7, 1927.

Oklahoma Utilities Association
Date of Affiliation—September 16, 1925.
Pres.—J. A. Frates, Oklahoma Union Railway Co., Tulsa, Okla.
Mgr.—E. F. McKay, Oklahoma City, Okla.
Conv., Huchins Hotel, Oklahoma City, Okla., March 8, 9, & 10, 1927.

Pacific Coast Gas Association
Date of Affiliation—Sept. 18, 1919.
Pres.—W. S. Yard, Pacific Gas & Electric Co., San Francisco, Calif.
Exec. Sec.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.
Conv., 1927.

Pennsylvania Gas Association
Date of Affiliation—April 10, 1919.
Pres.—Allyn C. Taylor, Consumers Gas Co., Reading, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., Bellevue-Stratford Hotel, Philadelphia, Pa., April 6, 1927.

Southern Gas Association
Date of Affiliation—May 20, 1919.
Pres.—A. E. Merchant, New Orleans Public Service, Inc., New Orleans, La.
Sec.-Tr.—J. P. Connolly, 141 Meeting St., Charleston, S. C.
Conv., Atlanta, Ga., April 19, 20, 21, & 22, 1927.

Southwestern Public Service Association
Date of Affiliation—September 26, 1923.
Pres.—H. E. Borton, Mineral Wells Electric Co., Dallas, Texas.
Chairman Gas Section—C. K. Fletcher, Fort Worth Gas Co., Fort Worth, Texas.
Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.
Conv., 1927.

Wisconsin Utilities Association
Date of Affiliation—March 25, 1919.
Pres.—John St. John, Madison Gas & Electric Co., Madison, Wisc.
Exec.-Sec.—J. N. Cadby, 445 Washington Bldg., Madison, Wis.
Conv., 1927.

Geographic Divisions

Eastern States Gas Conference
Date of Formation—April 11, 1923.
Pres.—S. P. Curtis, American Gas Co., Philadelphia, Pa.
Sec.-Tr.—J. C. Smith, Consumers Gas Co., Reading, Pa.
Conv., Bellevue-Stratford Hotel, Philadelphia, Pa., April 7 & 8, 1927.

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(Address All Communications to Key Number)

SERVICES REQUIRED

ENGINEER—Large operating company desires the services of an engineer with experience in the application of gas and the selling of industrial gas appliances. State age, past experience and salary expected. Address A. G. A.
Key No. 072.

WANTED by large gas company in middle west, salesman for industrial gas appliances. Address A. G. A.
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WANTED—A fast growing Gas Syndicate operating a number of Gas Companies desires the services of an experienced gas appliance solicitor. Only trained and experienced men with good references need apply. A good opportunity for a live, wide-awake salesman. Address A. G. A.
Key No. 079.

SALESMEN—Large Public Utility Company operating in Central New York and many other states, desires to employ several securities salesmen to sell company securities. Excellent opportunity. State salary, age, experience, married or single. Address A. G. A.
Key No. 080.

INDUSTRIAL GAS SALES REPRESENTATIVE: Gas company in a Middle Atlantic State has an opening for a technical college graduate, with fundamental knowledge of application and combustion of various fuels, to sell gas for industrial uses. Must be capable of making plant surveys of heat applications. State age, education, experience and salary desired. Address A. G. A.

INDUSTRIAL GAS SALESMAN—Must have sufficient engineering experience and ability to make estimates, recommendations and demonstrations: and also must have that quality of salesmanship which can bring about the signing of contracts. Company operates in a city of approximately 200,000 inhabitants. Address A. G. A.
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A NEW GAS APPLIANCE COMPANY desires to employ Gas Appliance Salesman who has had considerable experience in selling Water Heaters, boilers, etc. State age, salary expected, experience. Address A. G. A.
Key No. 089.

INDUSTRIAL GAS SALESMAN with two or more years' experience with various industrial applications to join Gas Company industrial sales force with good opportunity to develop into supervisory position. Address A. G. A.
Key No. 090.

SALESMAN—Chiefly for gas-fired steam radiators, also other gas appliances to work in New York City. One acquainted with plumbing and heating trade preferred. Salary and commission basis. Address A. G. A.
Key No. 094.

A PROGRESSIVE Gas Company in Mass. has an opening in its Industrial Gas Engineering Department for a Technical College Graduate to sell gas for industrial uses. State age, education, experience, and salary desired. A fine opportunity for the right young man. Address A. G. A.
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WATER HEATER SALESMAN with experience with various installations to join Gas Company sales force with good opportunity for development. Address A. G. A.
Key No. 096.

SHOP FOREMAN—Wanted by Company operating in the Metropolitan District of New York City. 25,000 Meters. Must be thoroughly familiar with all classes of work on consumers' premises, industrial appliances, routing and transportation. Give age, experience and compensation desired. References will be considered confidential if requested. Address A. G. A.
Key No. 097.

CHEMICAL ENGINEER with some experience in the manufacture of blue water gas wanted by Eastern manufacturer. In replying please give full details of experience, education, personal qualifications, availability and salary desired. Address A. G. A.
Key No. 098.

EASTERN PUBLIC UTILITY company offers unusual opportunity for a man in their trades promotional department. Prerequisites are general knowledge of gas distribution and utilization with special reference to house-piping layouts; acquaintanceship with building trades methods; must be able to interpret blue prints and execute them if necessary; must have personality which will make contacts with architects and contractors productive. Address A. G. A.
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WANTED—Am open for position as appliance salesman with appliance manufacturer, experience covers over fifteen years in the sale of gas ranges, automatic water heater and heating appliances, or as manager of appliance sales department with a gas operating company, experience includes executive and technical training. Married. A1 references. Address A. G. A.
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WANTED—Position as Gas Engineer or Superintendent of property serving 30,000 or more meters. Fifteen years' experience in high and low pressure distribution, coal and water gas production. Address A. G. A.
Key No. 211

EXECUTIVE—technically trained engineer, experienced in coal and water gas manufacture, high and low pressure distribution, electrical generation and distribution, purchasing, handling of securities, with sales experience, etc., desires a position of responsibility. He is at present employed, 33 years old, married and can leave on comparatively short notice. Has the best of references and will go anywhere. Has broad experience and can show increased gross and net earnings. Address A. G. A.
Key No. 215.

YOUNG MARRIED MAN—Thirty-one years old. Thoroughly experienced in every phase of selling Gas and Electric merchandise through Public Service companies by the Meter-Reader-Salesman plan of selling, desires position with Public Utility Company. Can make a real success of your merchandising department under this plan. Have also had three years' road experience selling electrical merchandise, organizing sales crews for dealers, etc. Available about September 15 or October 1st. Address A. G. A.
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TECHNICAL MAN now employed as superintendent and industrial gas engineer desires new location. Thirty-six years of age. Fourteen years' experience in coal and water gas manufacture, sales and distribution. Services available upon reasonable notice to present employer. Address A. G. A.
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MANAGER OF GAS PROPERTY—with twenty-five years experience in all branches of business, specialist in building up small companies, desires to make change in position. Address A. G. A.
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HOME ECONOMICS UNIVERSITY GRADUATE desires a position as a Home Service Director. Has had experience in organizing and directing such a department with a Public Utility company. Address A. G. A.
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P. H. GADSDEN	Philadelphia, Pa.
ARTHUR HEWITT	Toronto, Can.
ALFRED HURLBURT	Pittsburgh, Pa.
J. B. KLUMPP	Philadelphia, Pa.
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